SOUTHERN POWER AND INDUSTRY

Ad Index, page 112

JULY, 1950

In This Issue

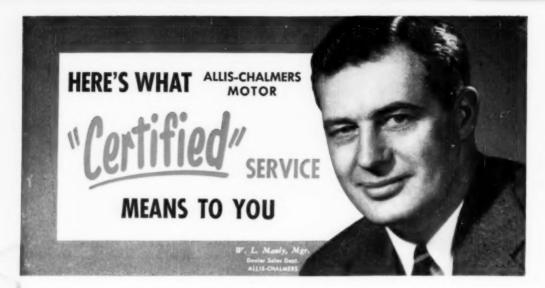
REPORTS FROM SOUTHERN PLANTS

39 Georgia-Unique Open House Atlantic Steel Company Texas-New Aluminum Plant-Alcoa 42 120,000 kw from Gas Engines Georgia-Utilization of Wood Scraps 47 Radio Frequency Treatment Kentucky—Power Factor Correction
Tube Turns, Inc., Louisville 48 North Carolina-Protection of Piping 50 Carolina Power & Light Co. Texas—20 Acre Refrigerated Warehouse Alford Refrigerated Warehouses, Dallas 52 Texas—Materials Handling 57 Tube-Kote, Inc., Houston Kentucky—Gas Cleaning Wet Collection Case Histories 58

For Full Table of Contents, See Page 3

South Carolina-Turbine Maintenance

Alcoa's New Texas Plant
Radial Type Engines
See Page 42



THE WORD SERVICE has those in ings than there are definitions in THE WORD SERVICE has more meana dime store dictionary. It is often used insincerely as a catchword lure . . . a pretense as shallow as frost on a window. To others, service is a natural and obligatory complement of selling . . . helping customers select what best fits their needs, filling the order accurately and promptly, and insuring that performance fulfills the promise.

"The meaning of Allis-Chalmers Certified Service is clear and unequivocal. It backs up product performance and assures the buyer that dependable Certified Service is conveniently close.

It is unique, efficient and sound. Unique, because it allies Allis-Chalmers with independently owned and operated shops. Efficient, because it minimizes delay and eliminates heavy transportation expenses. Sound, because the work is performed by reliable and experienced concerns.

"This policy is practiced by all of the 82 A-C Certified Service Shops in every major U. S. industrial area.

NEW MOTORS AND CONTROLS, TOO

Remember - your nearest A-C Authorized Dealer or Certified Service Shop also offers a complete line of new motors and controls to 200 hp.

ALLIS-CHALMERS, 954A SO. 70 ST. MILWAUKEE, WIS.

Birmingham - Elect Repair & Serv. Co. Montgomery -- Standard Electric Co.

Rishee-Conner Electric Co., Inc. CALIFORNIA

CALIFORNIA
San Diego—Calif, Elect, Works
Les Angelet—Larsen-Hogue Elec, Wks.
Oakland—T. L. Rosenbers, Congrany
San Francisco—Weidenthal-Gosliner San Jose Rosendin Elec. Works

Denver Baker Electric Company

CONNECTICUT

Hartford—Charles H. Leppert Waterbury—Elec, Motor Repair Co.

Jacksonville Turner Elec. Works Miami Penninsular Armature Wits. Tampa Tamps Armature Works

GEORGIA

Atlanta Bearden-Thompson Elec. Co. Columbus Buith-Gray Electric Co.

ILLINOIS

Chicago Chicago Electric Company Marion - Giles Armature & Elec. Whs.

INDIANA

Indianapolis - Scherer Electric Co.

Evansville - Evansville Elec. & Mig. Co. IOWA

Sioux City-Smith Elec. & Supply Co.

KANSAS Wightta—Tarrant Elec. Machinery Co.

New Orleans—Industrial Electric Shroyegart—Rhreveport Arm. & Elec.

Brewst-Stanley J. Leen Company

MARYLAND

one Elec. Co., Inc. Baltimore-Key

Raurenco - Roland B. Glines Co.
Roslindale - Rauney Electric Motors
Springfield - Elec. Motor Repair Co.

Duluth-Micke Electric Works, Inc. Minneapolit-Parsons Electric Co.

Ludke Electric Company MISSOURI

Kansas City Boese Hitburn Elec. Co. 87. Louis French-Gerleman Elec. Co.

Omaha—Omaha Electrical Works

NEW HAMPSHIRE

NEW JERSEY

New YORK
Buffalo-Robertson Electric Co., Inc.,
Jamestown - A. E. Westburgh
New York - Consolidated Elec. Meter
Rachester - Vanderlinde Elec. Cerp.
Litica - Mather Evans & Dreid Co.
Watertown - Watertown Electrics, Inc.

NORTH CAROLINA

OHIO

Cincinnati-Cincinnati Elec. Equip. Cincinnati-Electric Service Co.

MASSACHUSETTS

MICHIGAN

Grand Rapids - Grand Rapids Ind. Co.

MINNESOTA

MISSISSIPPI

NEBRASKA

NEW JERSEY
Attantic City—Charles A. Buckley
Paterson—Elec. Service Repair Co.
Trenton—Lockwood Elec. Motor Serv.

NEW MEXICO

-Powell Electric Co.

Charlotte-Southern Elec. Serv. Co. Rocky Mount-Hammond Electric Co.

oux Falls-Elec. Motor Repair

THERE ARE

VIII CEGINAL

Guyahoga Falis—A-C Supply Company Toleds—Romanoff Electric Company Youngstown—Winkle Electric Company

OKLAHOMA

Oklahoma City-Southwest Tulsa-Smith-Milliann Ele

OREGON

Eupene - Kalen Elec. & Mach, Co. Klamath Falts - Bay Bigger Elec, Partiand - Milwaukee Machinery Co.

PENNSYLVANIA

Pennstivania Johnstow-Universal Elec. Mfg. Co. Osceola Milis-Mid-State Elec. Equi Philadelphia - Elec. App. Repair Co. Pittsbargs-Penn. Elec. Coll Corp. York-Industrial Electric Company

RHODE ISLAND

SOUTH DAKOTA

TENNESSEE

LaFellette-Standard Armeture W Memphis-Ind. Elec. & Supply Co.

THROUGHOUT THE U.S.A.!

Amarillo -G. E. Jones Electric Co.
Dallas - Industrial Elec. Equip. Co.
El Paso - B & M Machinery Company
Ft. Worth - Central Electric Company
Houston - Boy A. Berentz Company

VIRGINIA

Richmond-Wingfield & Hundley Reanche-Virginia Armature Company WASHINGTON

Stankane-Lee F. Austin Company

WEST VIRGINIA -Charleston Elec. Supply

WISCONSIN

Srean Say—Bremeter Electric Co. Milwankoo—Dicts Electric Compas Wausau—Electric Motor Service Wis, Rapids—Staub's Elec. Shop

SOUTHERN PROVER & INDUSTRY or providing matrix at the E. Crawford St., Dallow, Ga., I. W. R. C. Smith Pairboling Company, Dalton and Atlanta, Ga. U. St. A. English of the Company of the

Volume 68

Number 7



WATER TREATMENT SERVICE AGREEMENT WORKS FOR YOU

OPERATION of your plant under a Nalco Water Treatment Service Agreement gives you two important safeguards against water treating problems in any form. First, Nalco will provide proper water treatment chemicals and procedures. Second, an experienced Nalco Service Representative will make regular visits to your plant, and is on call at any time to deal promptly with emergencies.

Whether you have 10 or 10,000 BHP, this combination will provide what thousands of Nalco System users have learned to take for granted: permanent water treatment security.

Write, now, for full information on a Nalco Service Agreement for your plant. From routine water treatment reports and water sample analyses, experts at Nalca Laborataries keep a complete record of your plant water treatment — can assist materially in maintaining permanent water treatment security.

Nalco

SERVICE AGREEMENT SECURITY FEATURES

- COMPLETE WATER TREATMENT SUR-VEY of your plant by an experienced Nalco representative.
- LABORATORY ANALYSES of watersamples . . Initial complete enalyses, followed by routine sampling and analyses as checks on plant tests.
- RECOMMENDATIONS of chemicals, testing and control procedures to establish water treatment security.
- REGULAR CALLS by a Nalco Representative to assure continuously successful treatment.
- REPORT SYSTEM to Nalco Laboratories gives cross-check on all phases of the Nalco System; enables keeping of complete performance records on your plant.
- CONSULTING SERVICE always available to assist in solving current problems and in planning changes of additions to your plant which may alfect water treatment.

NATIONAL ALUMINATE CORPORATION
6226 West 66th Place • Chicago 38, Illinois

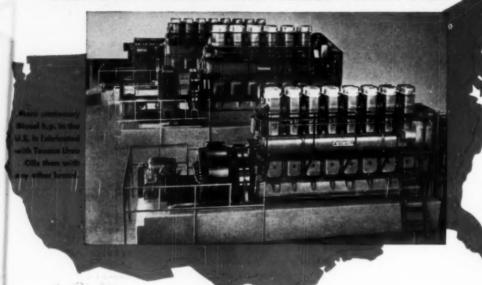
Canadian inquiries should be addressed to Alchem, Limited, Burlington, Ontario, Canada

THE

SYSTEM • Serving Industry through Practical Applied Science

Better Compression ...Better Combustion

... and less fuel consumption when you lubricate Diesels with TEXACO URSA OILS



Texaco Ursa Oils are especially made to stand up under heat and pressure and to resist oxidation. They keep engines free of harmful carbon, varnish and sludge. Thus, valves stay active, ports open, and rings free for proper seal. Better compression and combustion, and lower fuel consumption result.

Maintenance costs, too, are lower, because Texaco Ursa Oils maintain their friction-fighting films . . . constantly guarding against wear and assuring longer life for bearings, pistons, rings, inder liners.

Leading Diesel engine manufacturers approve them and operators everywhere use them for every type and size of Diesel engine.

Let a Texaco Lubrication Engineer work with you to bring down your Diesel operating costs. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Ursa Oils

SOUTHERN POWER AND INDUSTRY

JULY 1950



Eugene	W.	O'E	rien
Managi	ng !	Direct	ter

Francis C. Smith, Editor

Richard L. Priess

Hunter Hughes Regional Editor

M. M. Lyon

J. A. Moody Production Manager

Business Representatives

- R. L. Bogers, 290 Madison Ave., New York 17, N. T.—Phone Murray Hill 2-4950.
- Gerard Teasdale, 78 Manhattan Ave., New York 25, N. Y.— Phone Murray Hill 2-4959.
- J. D. Parsons, 63 Barker St., P. O. Box 412, Station C., Buffalo 9, N. Y.—Phone Garfield 5532.
- A. B. C. Smith, 609 Caxton Bidg., Cleveland 15. Ohio.—Phone Cherry 1-7852.
- P. O. E. Johnson, 168 North Michigan Ave., Chicago 1, III.—Phone, Central 6-4121.
- L. B. Chappell, Auditorium Bidg., 427 West 5th St., Los Angeles, Calif.—Phone, Michigan 9849.
- W. Cliff Rutland, 1762 Poston Circle, Gastonia, N. C.— Fhone 7995.

Annual Subscription—\$1.00 Foreign—\$10.00

Published monthly at 115 E. Gordon, Dalton, Ga.

Dalton, Ga.
by W. R. C. SMITH PUB. CO.
Publishers also of : Tertile Indus

Publishers also of: Testile Industries, Electrical Bouth, Southern Hardware, Southern Automotive Journal, Southern Building Supplies.

W. J. Rooks, President; R. P. Smith, Executive Vice-President T. W. McAllister, Vice-President E. W. O'Brien, Vice-President A. E. C. Smith, Vice-President O. A. Sharpless, Treasurer; A. F. Roberts, Secretary.

CONTENTS

Aluminum Made in Texas—Power from New Type Engines	4
Making the Most of Wood Scraps	4
Power Factor Improvement at Tube Turns, by James E. Barker	4
Aluminum Jacketing Solves Protection Problem for C. P. & L.	5
Twenty Acre Refrigerated Warehouse	5
Air Powered Hoists Handle Pipe	5
High Temperature Gas Cleaning, by John Kane	5
A Guide to Turbine Maintenance, by Robert H. Emerick	61
How to Maintain Industrial Controls, by W. P. Patrick	6

PRACTICAL DISCUSSION

Chains Need Good Lubricants	74
Turbine Shell Supports	74
Aids to Boîler Operation	76
Dodging Wiring Pitfalls	76
Preventive Maintenance for Oil Filled Transformers	78

DEPARTMENTS

PACTS AND TRENDS	5	EDITORIAL 78
BUYERS INFORMATION 1	6	NEWS OF THE MONTH 83
TIMELY COMMENTS 3	19	NEW EQUIPMENT
INDUSTRY SPEAKS 4	1	INDEX TO ADVERTISERS112

Contents indexed regularly by Engineering Index, Inc. Copyright, 1950, by W. R. C. Smith Publishing Company

Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 886 PEACHTREE ST., N. E., ATLANTA S, GEORGIA

NOW! uniform combustion efficiency from high peaks to low loads with the

ENCO TYPE K

OIL-GAS BURNER UNIT

HERE'S THE LATEST advance in burner units, designed to provide completely uniform combustion over the entire load range. The new ENCO Type K Oil-Gas Burner Unit is especially effective where steam demands swing sharply over short periods.

THE ENCO TYPE OIL-GAS BURNER UNI Offers These Additional Advantages:

ENCO TYPE K OIL BURNING UNIT

Natural or forced draft operation.

2 Register draft tube designed for installation in 9", 131/2", 18" and 221/2" furnace walls.

3 No movable blades.

4 Air vanes provide fixed turbulence over entire load range. Adjustable for long or short flame.

Air volume control damper.

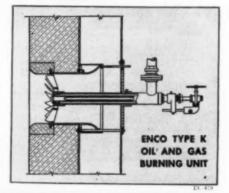
Hinged door for easy access to internal parts for inspection or removal.

Suitable for either steam or mechanical atomizing type oil atomizers.

Gas burner gun can be added for combination of gas and/or oil.

9 Comes in a wide range of sizes and capacities.

This new Type K Unit is the result of pioneering research, aimed to help you achieve more efficient, more economical boiler operation. Write today for further information, or see your local Enco Representative.



S WEST STREET, MEW YORK &, MEW YOR

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

July, 1950

120 NORDBERG GAS ENGINE UNITS of the two cycle radial type are connected through vertical shafts to d-c generators that supply power for the new POINT COMFORT WORKS of the Aluminum Company of America, near Port Lavaca, Texas. Nominal generating capacity of the power plant is 120,000 kw. Under normal operating conditions, the total output of the plant will be approximately 2,750,000 kwh per day. 40 units are housed in each of three engine rooms, one for each pot line.

Complete semi-technical description of the wast project, featured in this issue of SP&I, includes power supply, gas engines, generators, auxiliary equipment, electrical conductors, and natural gas system. Plant consists of 25 buildings with approximately 18½ acres of floor space. Covering of production buildings represents the largest single application of aluminum industrial corrugated roofing and siding to date, greater portion of which was fastened to the buildings by the stud welding process.

- THE SECOND MOBILE DISPLAY UNIT of the Southern States Equipment Corporation of Hampton, Georgia is now on the road displaying SS power transmission and distribution equipment to utility people throughout the Southeast and Eastern Seaboard. The first unit, which went on the road in March, 1948, covered over 50,000 miles and was viewed by thousands of utility men in 39 states. The new truck will visit all 48 states in its coast-to-coast tours.
- OFFICE BUILDING OF GULF STATES UTILITIES COMPANY'S new ultra-modern service center in Beaumont, Texas has a 150 ton capacity HEAT PUMP SYSTEM. Components of the electrically driven mechanical heat pump are constant temperature water wells, two 75 ton York freon compressors, condensers and water chillers, circulating water pumps, air handling units utilizing the same water coils for heating and cooling, an all sheet metal duct distribution system and automatic control instruments.
- AIR POLLUTION and emphasis on public nuisance control has focused attention on the problems of high temperature stack gas cleaning. With wet collection methods, further reduction in solids escapement is possible from operations like the electric melting furnace for steel, the zinc oxides from brass furnaces, and oxides from battery lead melting.

ADVANTAGES: Collection efficiency high on particles in the small micron size and the high temperature and/or moisture laden gases can be handled without difficulty. SHORTCOMINGS could be listed as troubles from corrosion where acid forming gases or materials are involved and the reduced collection efficiency on sub-micron particles encountered in metal fume collection problems and similar applications.

ATLANTIC STEEL COMPANY'S recent combined Open House and Southern Agricultural Implement Show was attended by more than 6,000 in Atlanta, Georgia. The industrial show, which bore the theme of DIXISTEEL ON DIXIE FARMS began with visitors observing the making of raw steel in Atlantic's three 72 ton capacity open hearth furnaces and ended with exhibits displayed by 35 Southern manufacturers of farm implements, equipment and modern machinery.

In sharing their Open House with a group of its customers, Atlantic Steel departed from the conventional Open House procedure of restricting such occasions to exhibition of the host company's operation. Each exhibitor is a customer of the company and each of their implements an example of agricultural application of semi-finished steel products. This unique approach in customer cultivation, public interest and industrial relations is highly commendable.

- IN THE NEW STEAM-SPRAY PAINTING PROCESSES, using steam instead of compressed air, paint is both heated and atomized at the nozzle, thus eliminating need for pre-heating. Tests by one leading manufacturer of paints, chemicals, and lacquers indicate one pass application for 2 mils of film, increased efficiency and lower finishing costs. Labor is saved, paint is saved through less overspray, and thinner is saved because less reduction is required for spraying. One manufacturer of all electric steam power plants has announced boilers for such applications in a range of capacities suitable for from 1 to 10 spray guns or larger.
- HOUSTON, TEXAS will be host to the 1951 INSTRUMENT SOCIETY OF AMERICA national exhibit and technical meeting at the Coliseum, September 10-14, 1951. William H. Fortney, instrument foreman at the Humble Oil & Refining Company's Baytown Refinery is chairman of the committee handling arrangements. The 1951 Houston meeting will be the first national I.S.A. convention held west of the Mississippi.
- IF YOU'VE BEEN HOLDING OUT FOR AN ATOMIC POWERED AUTOMOBILE, now is the time to give up and buy one of those old-fashioned gasoline jobs. Dr. Lewi Tonks of the General Electric Company states that nuclear power will never be used for the "small tasks". He points out that an atomic power plant won't run unless it contains a certain minimum amount of "fuel". The minimum is such that it is not economical to run unless tens of thousands of kilowatts are generated, and this is a lot more than a car uses.
- MICROWAVES used for communication between a generating plant and an important sub-station 12 miles away are re-directed around a hill by a 20 ft square aluminum sheet. Microwaves travel in straight lines much like television signals. Since there was no direct line of sight between the two stations, the aluminum reflector was mounted on a mountain top visible from both stations. It redirects the microwaves as a mirror reflects light.

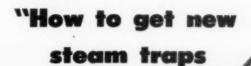
Perforations in the sheet reduce its wind resistance without impairing its performance. Because microwaves have a wave length of about one foot, and the openings are only one inch wide, the waves do not pass through. The system operates in both directions and is capable of sending seven voice conversations simultaneously.

- FIRST UNIFIED EFFORTS OF INDUSTRY to reduce the number of colors for industrial equipment are beginning to bear fruit as a result of an agreement on four accurately defined grays as standard finishes. General acceptance of the American Standards Association GRAY FINISHES FOR INDUSTRIAL APPARATUS AND EQUIPMENT is expected to reduce considerably the cost of finishes and finishing. It will be of further value to purchasers of equipment by making it easier to specify and to match grays and to produce color harmony of machines and other equipment purchased from different manufacturers. Copies of the new standard are available at 35 cents a copy from A.S.A., 70 E. 45th Street, New York 17, N. Y.
- THE NEW THERMALASTIC INSULATION, consisting of mica flakes embedded in tough, heat-resistant synthetic resin, is claimed to have a life at least 10 times as great as previous insulations under conditions of severe electrical stress. In announcing the insulation, Westinghouse notes developments in high-voltage generator insulation—the mica-folium insulation in 1911, and the asphalt-impregnated continuous-mica-tape insulation of 1930.

Both of these used mica flakes; held together in the former with shellac, and with asphalt in the latter. Generator ratings have increased to the point where old insulations expand with thermal changes in copper and iron, but do not again resume original positions when the coil cools. The new insulation has sufficient elasticity to expand and contract with the coil, plus physical strength to withstand these expansion forces.

Write the editors for additional information on any of the above items.

SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Georgia



Trade steam losses

Cost of Steam Leaks at 100 Pounds Pressure (Assuming steam costs 50 cents per 1000 fbs.)

Size of Orifice	Lbs. Steam Wasted Per Month	Total Cast Per Month	Yotal Cost For Your
1/2"	835,000	\$417.50	\$5,010.00
3/8"	470,000	235.00	2,820.00
1/4"	210,000	105.00	1,260.00
1/8"	52,500	26.25	315.00
1/16"	13,200	6.60	79.20
1/32"	3,400	1.70	20.40



Saves \$39.62 MONNHLY — \$98 for Armstrong Steam Traps cut the feet oil consumption at Wisconaic Cleaners, Milwaukee, from an overage of 1167 gellies per month down to an average of 625 gellions per month. The traps were better than "Jer free" — they pay back their porchase pride more than saven times avery year!

IT COSTS far more to live with leaky steam traps than it does to replace them with Armstrongs — the traps that pass no steam. Measure their cost against steam losses caused by traps that let steam get by (see left).

In Armstrong traps the discharge valve is water-sealed at all times—no steam gets to it. There's no chance for dirt to hold the valve open and let steam escape. Armstrong traps don't COST money, they SAVE money. Ask your nearby Armstrong representative to figure on the traps you need now.

ARMSTRONG MACHINE WORKS 806 Maple St., Three Rivers, Mich.

SEND FOR THE STEAM TRAP BOOK. It tells how to figure condensate loads, how to select traps. Includes prices, data, capacities of Armstrong Steam Traps. Write for your copy.



ARMSTRONG STEAM TRAPS

SOUTHERN : OWER & INDUSTRY for JULY, 1950

versi-pak®

A NEW AND HIGHLY VERSATILE PLASTIC PACKING



versi-pak is the result of more than two years of testing and development. This new plastic packing can be used in an exceptionally large number of applications, and simplifies storage and inventory problems. It is being used successfully in reciprocating and centrifugal equipment and in hydraulic systems. Recommended for temperatures up to 350°F.; pressures up to 600 p.s.i.; against air, water, low-pressure steam, and a long list of chemicals. Available also in non-graphited form (R/M No. 1846) for use in food-handling equipment. For your free copy of the new bulletin on versi-pak send the coupon below to the Packing Division, Manheim, Pa.

RAYBESTOS-MANHATTAN, INC.

PACKING DIVISION, MANHEIM, PA.

State

Zone

FACTORIES: Bridgeport, Conn.; Menheim, Pa.
No. Charleston, S.C.; Passaic, N.J.

Raybestos-Manhattan, Inc.	·
Packing Division, Manheim, Pa.	
Gentlemen: Please send me a free copy of the versi-pak bulletin.	
Name	
Position	
	RAYBESTOS-MANHATTAN.

RAYBESTOS-MANHATTAN, INC., Manufacturers of Packings - Asbestos Testilles Mechanical Rubber Products - Abrasive and Diamond Wheels - Rubber Coverad Equipment Brake Linings - Brake Blocks - Clurch Facings Fan Belts - Radiator Hore - Pewdered Metal

Address

City.

Finest Engineering for large.

or small ...

SPRINGFIELD is a builder of steam generating units for largest plants, but it also has an outstanding record for applying the same engineering skill to plants ordinarily classified as small. This is one reason why Springfield has been the choice of an increasing number of engineers anxious to have careful attention given to their jobs.

The installation shown at the left is a typical example of the clean, modern, carefully worked out designs Springfield is producing for the so-called small plant . . . this unit is for the Raton Public Service Company located at Raton, New Mexico. It will produce 35,000 lbs. of steam per hour at 425 p.s.i. operating pressure and 750° F. total steam temperature. Firing is by spreader stoker using western coal.

We will be glad to submit a proposal covering your requirements. See your nearest Springfield representative, or write.

SPRINGFIELD BOILER CO.

1957 E. Capitol Ave., Springfield, Illinois, U.S.A.
WORLDWIDE SALES AND SERVICE

NEW YORK • PHILADELPHIA • WASHINGTON, D.C. • DETROIT PORTLAND, ORE. • ST. PAUL, MINN. • HOUSTON • CHICAGO PITTSBURGH • ST. LOUIS • KANSAS CITY, MO. • SEATTLE BOSTON • ROCHESTER, N.Y. • MEXICO, D.F. • Export: READING, PA.

See our catalog in SWEET'S

Location: Raten Public Service Company, Raten, New Mexico Consulting Engineers: Burns & McDonnell, Kansos City, Me.

CHECK WITH YOUR CONSULTING ENGI-NEER ON YOUR MODERNIZATION AND NEW PLANT PROJECTS

TWO

A FEW REPRESENTATIVE BSERS

OF VARWAY STOW-OFF VENVES

Consylvania Pewer & Ught Co.
Claveland Bloc. Huminating Co.
Connecticut Light & Pewer Co.
Duke Pewer Co.

icorgio Pourer Co

Pacific Gas & Electric Co.

Philadelphia Electric Co.

Yarway Type "B" Seatless Tandem Blow-Off Valve. For pressures to 400 psi. Ask for Bulletin B-424. Admitted Vilegal Co

Anthonem Stool Co.
Colonese Corporation
Entimen Kedaki Co.
Chandrand Banduri. Co.

Call States Paper Co. Lever Bress, Co.

Misips Decige Corp. R. J. Raymolds Toducce Co Jolyan Process Co.

YARWAY

REASONS

FOR USING **GOOD BLOW-OFF VALVES**

- To be sure of tight blow-down lines.
- To withstand the severe punishment of regular or emergency blowing-down under pressure and periodic acid wash.

Yarway Blow-Off Valves are good blow-off valvesdesigned and built to safeguard beyond any doubt your sizeable boiler investment.

To give you drop-tight protection required for efficient boiler operation, Yarway offers Seatless Valves that have no seat to score, wear, clog and leak ... or heavy-duty Yarway Stellite Hard-Seat Valves.

Either valve, or any tandem combination, also provides ruggedness and safety beyond any emergency requirements.

It is no coincidence that more than 15,000 boiler plants throughout the world use Yarway Blow-Off Valves . . . and among high pressure plants, 4 out of every 5 are Yarway-equipped.

For the full story on blow-off valves for your boilers, write today for the Yarway Bulletin. Please mention pressure range.

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Ave., Philadelphia 18, Pa. Southern Representative: ROGER A. MARTIN Bone Allen Building, Atlanta 3, Go.



Yarway Unit Tandem Blow-Off Valve. Flanged type. Also available with welding ends. For pressures up to 2500 psi. Ask for Bulletin B-432.



Yarway Type "B" Angle Valve, cross-sectioned in open position. Note balanced sliding plunger design. For pressures to 400 psi. Ask for Bulletin 8-424



Yarway Stellite-Seat Straightway Valve, cross-sectioned in open position. Disc and seat ring are stellitefaced and ground. pressures to 2500 psi. Ask for Bulletin

B-432.





SAVE

General Electric's DP turbines, available in three frame sizes and a variety of ratings, can be profitably used in many different applications, yet they compose a standard line and incorporate standard parts. This standardization gives you four important benefits:

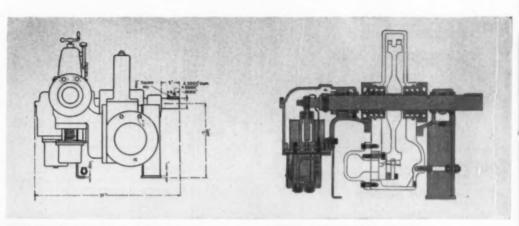


EASY TO STOCK SPARES

Because most parts are interchangeable on all models, spares can be stocked at low cost. A spare parts kit, containing 91 items, can be obtained with the turbine. This simple method of stocking spares lowers maintenance costs and provides protection for several DP's in your plant.

FOUR WAYS

WITH Standard Turbines



All models, regardless of frame size, horsepower, or speed ratings, have identical shaft height, keyways, and coupling fits. Thus, installation problems are simplified, and you can move these center-line supported units from job to job without a "custom line-up."

A BETTER TURBINE

Manufacturing savings from standardization are
passed on to you in the form of special features
at no extra cost. For instances hydraulic governing, combined trip-throttle valve, 30% speed range are advantages you'd expect to find only in custom equipment.

GREATER FLEXIBILITY

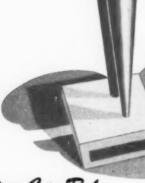
As the shaded parts in the diagram illustrate, most DP parts are identical on all frame sizes and ratings. In this way, you can adapt a DP for different job requirements with only minor changes. A different nozzle plate gives you a different horsepower output. A change in governor gears provides a new speed range. When modernization programs demand a change in plant operation, the DP's flexibility will save you money.

Ask your General Electric representative for full details about the DP mechanical-drive turbine or write for bulletin GEA-4955. Get the full details on how standardization will benefit your plant operation. Apparatus Department, General Electric Company, Schenectady 5, N. Y.

GENERAL (ELECTRIC

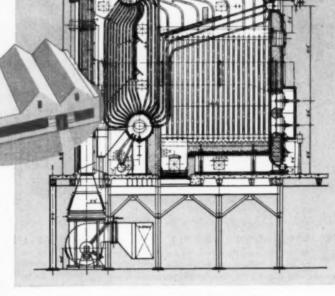
In the South

. Smokestacks are growing-



You Can Rely on Riley

When you select Riley Steam Generating or Fuel Burning Equipment, you can count on efficient trouble-free, thoroughly satisfactory performance because of excellent design and quality workmanship and because of Riley's extensive engineering experience. Riley's rapid growth has resulted from the outstanding performance of their equipment. Every user of Riley equipment will assure you, "you can rely on Riley."



75,000 lbs./hr. Riley Steam Generating Unit Masonite Corporation, Laurel, Miss.

Masonite started to use Riley boilers in 1939. Since that time Masonite has placed six different orders with Riley for seven Riley boilers with a steam capacity of 415,000 lbs. Mr. E. C. Grady, Plant Engineer, will gladly tell you of their experience with Riley boilers.





STOKER CORPORATION, WORCESTER, MASS

Boston New York Cincinnati Atlanta

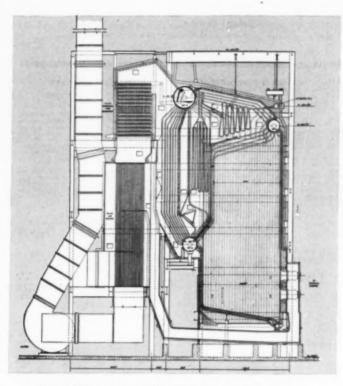
Philodelphia Washington New Orleans Memphis

Buffalo St. Louis Imbergh Cleveland

it Chies

BOILERS . PULVERIZERS . BURNERS . STOKERS . SUPERHEATERS . FLUE GAS SCRUBBERS

and you will find Riley Steam Generating Units under many of the recent ones!



Houston Lighting and Power Company, one of the largest Southern Public Utility companies is another good Riley customer. Since 1938 Houston has ordered only Riley boilers - 8 different orders for 9 large Riley Steam Generating Units - having a steam capacity of over four and a half million pounds of steam an hour. Conclusive evidence of the complete satisfaction obtained with Riley equipment.

All these well-known Southern plants use RILEY boilers

Southern Industrial Plants

Dow Chemical Co., Freeport, Texas Gaylord Container Corp., Bogalusa, La. Champion Paper & Fibre Co., Canton, N. C. Savannah Sugar Refining Co., Savannah, Ga. Crown Cork & Seel Co., Beltimore, Md. Crown Cork & Seal Co., Baltimore, Md.
Godchaux Sugars, Reserve, La.
Southern Alkali Corp., Corpus Christi, Texas
Mend Corp., Sytha, N. C.
Celanese Corporation of America, Narrows, Va.
Celanese Corporation of America, Bishop, Texas
Celanese Corporation of America, Rock Hill, S.
Celanese Corporation of America, Rock Hill, S.
Celanese Corporation of America, Hopewell, Va.
Celanese Corporation of America, Hopewell, Va. Celanese Corporation of America, Cumberland, Md. Ecusta Paper Co., Piegah Forest, N. C. Masonite Corporation, Laurel, Miss. Commercial Solvents Corp., Sterlington, Riegel Testile Corp., Ware Shoals, S. C. Calco Chemical Co., Piney River, Va. Calco Chemical Co., Piney River, Vs.
International Harvester Co., Louisville, Ky.
Humble Oil & Refining Co., Baytown, Texas
Congoleum Nairr Co., Cedarhurst, Md.
Mathieson Alkali Co., Lake Charles, La.,
Revere Copper & Brass Co., Baltimore, Md.
Standard Oil Co. of La., Sterlington, La.,
Lone Star Steel Co., Daingerfield, Texas
Park & Tilford, Inc., Midway, Ky.
Alamo Refining Co., Sweeny, Texas
Republic Creoscing Co., Norfolk, Va.
US. Gyppum Co., Plasterco, Va.
Brown & Williemson Tobacco Co., Petersburg, Va.

Southern Public Utility Plants

South Carolins Power Co., Charleston, S. C. Mississippi Power Co., Hattiesburg, Miss. Arkansas Power & Light Co., Little Rock, Ark. Arkanas Power & Lught Co., Lettle Roca, Ark.
New Orleans Public Service Co., New Orleans, Le.
Northern Virginia Power Co., Winchester, Va.
Gulf Power Co., Penascola, Fla.
Florida Power & Light Co., Lauderdale, Fla.
Carolina Power & Light Co., Moncure, N. C. Southwestern Public Service Co., Borger, Texas Houston Lighting & Power Co., Houston, Texas



A survey of your Power Plant by a consulting engineer will possibly show ways of making surprisingly le

WATER-COOLED FURNACES . STEEL-CLAD WATER SETTINGS . AIR HEATERS

. . it will pay you to visit modern Riley Installations before purchasing Boiler or Fuel Burning Equipment

WHERE TUSET IT

-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, hand books and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on page 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

STEAM PLANT . . . FURNACES, BOILERS, STOKERS, BURNERS

- 4 SOOT BLOWERS Catalog 1014 Defacibes features which make individual G-D units automatic at any time after installation by simply adding a drive to existing equipment. All blowers made automatic sequential by addition of control panel.— DIAMOND FOWEE SPECIALTY CORP.
- 11 WATER TUBE BOILERS Bulletin, 12 pages — Illustrates and describes special and standard power plant believs and packaged steam generators. Complete engineering data, dimensions, illustrations, etc.— SPRINGFIELD BOILER CO.
- 20 COAL CRUSHERS AND PULVERIZE-ERS—Data Sheets—Give important facts on the efficiency of coal preparation in power plants using American rolling ring crushers, giving improved combustion and reduced ash pit leases through low cost unitom coal sizing.—AMERICAN PULVERIZEE.
- 31 SPREADER STOKEE—Bulletin B-7 describes the long successful Chicago automatic spreader stoker, now manufactured by Standard at Eric, and backed by experience in designing and building over 20,000 units—secellent fuel distribution, ash disposal, feeding, air proportioning and turbulence.—THE STANDARD STOKER CO.,
- 34 OIL BURNERS FOR LIGHT OR NATIONAL AIROIL BURNERS FOR LIGHT OR NATIONAL AIROIL SHEET OF THE STATE OF THE ST
- BOILER GIETH SEAM PROTECTOR
 —Bulletin 5-A—Describes the application of National Boiler girth seam protectors
 in gaining greater safety, greater economy
 and greater reliability in fire tube boilers.—
 NATIONAL BOILER PROTECTOR CO.
- 63 DUST COLLECTORS. STACKS—Catalog 110—Describes the efficient combination of fans, breaching, stack and dust collector, in three main types to cover all service conditions, well proven in wide-spread use.—PRAT-DANIEL CORP.
- 74 AUTOMATIC OIL IGNITION SYSTEM
 —Bulletin OB-PC—Shows the applies
 tion and operation of automatic retractable
 electric oil ignition systems for lighting off
 pulverized fuel, oil or gas by remote control,
 and out of the hot zone—THE ENGINEER
 CO.
- 77 STEEL BOILEES—Catalog 92—Describes Kewanee steel boilers in square jacket, round jacket and various types and sizes, suitable for small and moderate operations—with charts giving ratings, specifications measurements and application.—KEWANEE BOILEE CORP.
- 78 WELDED BOILERS—Bulletin 8-67—
 turing three-pass gas travel, large liberating area and combustion chamber, tapered water legg, double section grate—1800 to 44 000 sq ft, for coal, oil or gas firing.—THE BROWNELL CO.

- 80 ASH HANDLING EQUIPMENT—Data Sheets deserbe an ash intake and grid hopper assembly to feed ashes into the main conveyor line—ash receiver and separator to receive ashes from conveyor line—in washer to receive spent steam. BEAUMONT BIRCH CO.
- 91 ELECTRICAL PRECIPITATORS FOR UID MATTER—Booklet—Describes the various types and applications of Cottrell and electrical precipitators for the collection of solid and liquid matter suspended in hot or cold gases, giving complete engineering data and installation illustrations.—WESTERN PRECIPITATION CORP.
- 95 DUST CONTROL Booklet Describes how to increase production, reduce costs, safeguard workers' health through the installation of tailored, adequate dust control systems, carefully designed to meet your needs. LIBERTY ENGINEERING & MFG. CO., INC.

FANS, PUMPS, COMPRESSORS, HEATERS, HEAT TRANSFER

- PUMPS—Bulletin B-148—Gives full description, typical and unusual installations, applications and engineering data, and full illustrations of the Peerless Hydro-Foil pump which moves liquide against maximum heads with minimum submergence, at low cost and low maintenance.—PEERLESS PUMP DIVISION, FOOD MACHINERY CORP.
- 114 DEAERATING HEATERS Bulletin 18 pages, "2-Stage Deaerating Heaters," outlines the principles of deaeration, describes the design, operation and application of Graver deaerating heaters—both vertical and horizontal in type, GRAYER WATER CONDITIONING COMPANY.
- 121 HIGH SPEED CENTRIFUGAL SUCTION Bulletin 236 Gives specifications, construction features, exterior and sectional views, dimensions, rating table of Type DBH high speed, single stage, double suction pumps, capacity 100 to 1,000 G.P.M.—WARKEN STEAM PUMP CO., INC.
- 122 FANS Catalog—Gives details of a wide variety of air handling equipment for use in industrial, power and large service plants to give mechanical draft, space heating and air conditioning, and to perform various blowing and suction functions in process plants.— CLARAGE FAN CO.
- 177 HEAT EXCHANGERS, HOT WATER GENERATORS—Bulletin H.1—Gives complete details concerning instantaneous and storage hot water generators, closed heat exchangers 60 to 4400 g.p.m. THE BROWNELL CO.
- 184 UNIT HEATERS Catalog 12 C-1 down-blow unit heaters, particularly intended for high installations ranging 15 to 45 ft above working zone, and other apot locations as described FEDDERS QUIGAN CORP.

INSTRUMENTS, METERS, CONTROLS, REGULATORS

- 211 BOILER FEED WATER CONTROL FOR HIGH-DUTY BOILERS—Bulletin 441—Describes the feed water control requirements of high-duty boilers, the Flowmatic principle of control, the characteristic for the control of the contr
- 215 TEMPERATURE REGULATOR —
 Catalog 550—Describes Sarco temperature regulator to keep heating coils and heaters at correct temperature—inexpensive.
 —SARCO CO., INC.
- 240 HUMIDITY CONTROL Bulletin 1902—Describes the new Type 190 Hygrostat which gives accurate humidity control—pneumatically operated and sensitive to the slightest changes.—POWERS REGULATOR CO.
- 256 PILOT REGULATING VALVES single seat pilot balanced regulating valves in four general classes, slip stem and rotary shaft for steam, air and gas—slip stem and rotary shaft for liquids—engineering data and application information.—BELFFELD VALVE DIV. MINNEAPOLIS-HONEY-WELL REGULATOR CO.
- 260 CONTROL VALVES AND TRAPS—
 Bulletin 645 Describes control valves and steam traps for particular application in the heating, compressing and operating of molding presses in plastic molding.

 —W. H. NICHOLSON & CO.
- 205 ADJUSTABLE INCLINED WATER COLUMNS—Bulletin T-1 gives details and applications of adjustable inclined high and low alarm water columns particularly designed for package type bollers up to 300 lb wsp.—Ernstilt package units for package type bollers.—ERNST WATER COLUMN & GAGE CO.

PLANT EQUIPMENT, TOOLS, PROCESS SPECIALTIES

- 307 MODERN LUBBICATION Bulletin Describes methods of modernizing with Manzel lubricators—pumps and compressors, wood and steel working machinery, presses, production and handling equipment. MANZEL, INC.
- 354 STEEL STORAGE TANKS—Bulletin,
 4 pages—"Welded Steel Tanks for
 Oil Storage"—contains a table giving diameters, heights, weights and shell ring thicknesses, for standard, flat-bottom tanks in a
 complete range of sizes from 500 to 150,000
 barrels capacity.—CHICAGO BRIDGE &
- 381 ELECTRIC PRECIPITATORS—Book-applications of Cottrel electrical precipitators for the collection of solid and liquid matter suspended in hot or cold gasea, with complete engineering data and flustrations.—WESTERS PRECIPITATION CORP.

391 CRUMMERS, GREFFORES, SETEMB-DERS, CHOPPERS — Bulletia, 4 pages, describes the types, since, impellies of persisting features of a mediera line of creating features of a mediera line of creating features of a mediera line of creating features of the control bullets of the requirements. Historical bullets of the callet site and control bullets of the control bull

PIPING, VALVES, PITTINGS, STEAM SPECIALTIES, TRAPS

- 405 VALVES FOR BOILED BOOM various models of Everlasting Valvus instanded for widespread applications in the bolice room, for celuma, blow-off and centred use.—EVERLASTING VALVE COMPART.
- 414 SPIRAL WELD PIPING Rutlecin 492 Describes spiral weld pine and relaxed Utilizar for extensive assuming applications in all kinds of pages TAY-LOK FORGE & PIPE WORKS.
- 420 WATER COLUMN GAGES AND AC-FREE, FRATCH, gare glasses and other accessories for boiler and tank of all pressures.— —ERNST WATER COLUMN AND GAGE CO.
- 440 REDUCING VALVES -- "Atles Reducing Valve Data Book" -- Gives complete information on Type "D" reducing valves of simple design, easy to inspect, adaptable, durable.- ATLAS VALVE OU.
- 461 TRAPS—Catalog E-4—Steam traps for law pressure and the contributed traps for law pressure and traps for law pressure and traps for law pressures, and there were proportionally as an educational textbook on compact of the compac
- 468 IMDUSTRIAL THERMOSTATIO excites 5 types for every power, heat, preces application; presence to 226 the. A comprehensive reference on advance-type draintee methods; plying diagrams; data for enlocating peopure size of trap.—W. H. MUSIOL-
- 492 VALVE CONTROLLES Enficient 492 8500, 8 pages, gives construction for tures, engineering design and date, characteristics and performance, specifications and applications, etc., et to "Positroi," Flabres 600 VERNOE CO.
- 404 RROWER GLOSE VALVE—Form 100 plustype bronne glade valve for 800 h service, suitable for govern services such as presents regulation, them posterio by-pass laser. In the service of th
- 496 EIGH PERSONNE BLOW-OFF VALVES-Bulletia B-682-Describes in complete detail Yarway sestions blow-off valves for pressures above 460 pol.— YARNALL-WARREG CO.

MAINTENANCE, PACKING, LUBRICANTS, WELDING

506 PACKERS IN SEMERAL - Garleck Control of the Procures and low pressures for water, air, seems, selds, solvents, oil and other liquids and gases.—THE GARLOGE FACKERS OF

- 507 PACKING FOR FUMPS Faidurparticularly for applications to centrifugnational property of the policy of the particular and retary pumps - THE BELMONT PACK ING & RUBBLE CO.
- 530 FACKINGS 16 page Catalog—Denorthes R/M packings for practically all becorriptions and industrial has, giving the date available.—BAYBESTUG-MANHAY TAN, INC.
- 532 ANODES FOR CATHODIC PROTECTS OF THE CONTROL OF
- 530 CHEMICAL SOOT REMOVAL—Bul-530 letin, 12 pages—"(Demical Removal of Soot and Sing from Beller Furnaces" describes development and action of Naco 8R-150, a new chemical cost remover.— EATIONAL ALUMINATE COST
- 551 IROW OFMENT OF MANY APPLI-Describes the various eyes of two commisfor repairs, for juinas, for gastesis, for seama, for water-proofing, for surface-proofing with many practical applications illustrated. —3MOOTHON MPS. 60.
- 576 COMPAND TEED LUBRICAYOUS
 576 Cathony 2-0-shows the majneering
 centre and spylication details of Model 31s
 forced-feed histinators for positive and astematic lubrication of sylinders and bearings—
 wide range, large sensity—MAJERU BROS.

POWER TRANSMISSION, MATERIALS HANDLING

- 606 MERKERGOOMS SPRED REDUCES for flowed by 18 hagger Dumphite for formation about the application of hereing bone reducers with flustratura, technical flowing for the first technical flowing for the flowing flowing for the flowing flowing for the flowing flowin
- 638 DESCRIPTION SYSTEMAS Describes Vergation conveyers for a wide variety of applications, custing down reading, described on the described of the state of the s
- 550 ByLL ELECTION SQUIFFICHT.

 This Chard describe its "Vibracal and the control of the control
 discovery per booling operating its exdiscovery per booling operating its exdiscovery per booling operating to exveyor system for booling by manufacture por
 down by means or office operating age
 of form by means or office operating age
 of control of the control operation of the control operation.

 The control of the control operation of the control operation of the control operation.
- 661 POWER TRANSMISSION AND ROUTENESS OF STREET OF STREET, STREET OF STREET, ST
- 675 ELECTRIC ROLLYS Belletin SP.
 451—Describes the new low perced
 it. A M vire rope electric halds with adjustable trollay mounting, special sigh torque
 hoist motor, single unit bensing, and other
 convenient enriceoring characteristics.—





BUSINESS REPLY CARD

PROBET GLASS PERSON NO. NOS. SES. DA.S. N. L. S. D., ATLANTA, SA.

Equipment and Review Editor
SOUTHERN POWER & INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

750-5

Please send me without obligation, free booklets described in the July 1950 issue of SOUTHERN POWER AND INDUSTRY as circled below:

1 4	- 15	23	31	34	39	63	74	77	78	80	91	- 95	113	114	121	122
177	184	211	215	240	286	240	295	367	364	361	391	406	414	430	449	461
448	460	494	495	805	987	530	B32	530	551	578	605	438	480	100	675	601
588	717	738	772	788	79.6	818	822	837	845	164	870	1003	1000	1010	1021	1035
1040	1044	1046	210	811	812	813	814	315	816	817	818	819	120	\$21	B22	823
824	825	826	827	828	127	830	831									

Also	-	for	ther	Inform	natios	-	follo	wing	New	Equipa	neet (200 PO	pos 96	107)
HI6								100	HIO	HIL	HIS	1513	H14	HIE

Name	Positio	pa		
Company Name			11 11	
Street		1	100	
an-	Zone	State		

68) SFEED REDUCERS OF VARCOUS PARENCES OF VARCOUS PARENCES OF SECURITY AND ASSESSMENT OF SECURITY ASSESSMENT OF SECURITY AND ASSESSMENT OF SECURITY ASSESSMENT OF SECURITY

688 ADJUSTABLE VARIABLE SPREE 1867—For engineers and calcames in making estimates on speed control for any machine or process. Prions dissandman applications for h by in 16 hp meters as an experimental control of the concation of the control of the concation of the control of the concation of the concation of the control of the concation of the control of the concation of the concation of the concation of the control of the con-trol of the control of the con-trol of the con-trol of the control of the control of the con-trol of the con-trol of the control of the control of the con-trol of the con-trol of the control of the control of the con-trol of the con-

WATER TREATMENT, AIR CONDITIONS-ING. REFRIGERATION, HEATING

717 WATER CONDITIONING bullets
107 WO-100, shapes—Outlines he prestoria, ear-vices and background of grave
Water Conditioning describes the facilities
for research in water conditioning for bullcres, pronous, peneral industrial and numbel
pal nos. Illustrated by installations of heprocess and section softeners, demineralizers
therifare, filters, sto.—GRAVER WATER
CONDITIONING CO.

730 SECLITE WATER SOFTERMES Decletin-Describes in detail the operation and application of Ochrane hydrematic single-control-valve Zeolite softenerwhich combine operations in a cingle unifor service, back-wash, brine and rines, sactwo stand-by positions.—OOOHEANE OOHE

772 UNIT HEATERS—Sulletin No. 200, pages—Complete design and application information on the new Thermobine direct from unit heater, delivering 550,000 per hour of draftless basied air at one of the complete of the complete of only 50 inches in diameter—FRAT DANIEL OORFORATION.

760 RETAINMENTION TROATS — bull700 in 175 — Describe inverted businhigh side floats for the discharging of liquidretrigenants queens—applicable to all systams where the active liquid refrigerant can
be carried on the low side. Diagrams, in
stellation views, capacities and engineering
data.—ARMSTRONG MACHINE WORKS.

796 INTERNAL TRRATMENT OF BOILD THE WATER - Bulletin 47—Explains the Naice system of internal treatment which parforms four important chemical functions to keep bolings and auxiliaries free of scale and corrected.—THE MATIONAL ALUMI-MATE CORP.

ELECTRICAL

816 "Wire Abad" "Discusses practive maintenance in electrical systems—the symptoms of inadequate wiring—and planter for anticipating electrical demands—ANA-ONNOA WIRE & CARLE COMPANY.

22 FAN COOLED ROPORS — Bulleting D2 51E-7160 and 05E-7150 — Describe the new design to be type totally enclosed fan cooled matter to be to the control of the dirty installations, 150 does not see — ALAIS-DELLMERS MFG O

837 ALUMINUM COMPUTORS — Free Booklet, "Insulation Questions and Answers" discusses insulated aluminum conductors and their diagrams, literations answer basic questions—what conductor sizes, how handled, as centually installed, the details about joints as terminals.—ALUMINUM COMPANY OF AMBRICA.

845 OURIDIAM, PANKES, ENGLOURIS — Descriptive Bookiet — "Contract Manufacturing in Sheet Metala" "Doscribes job-fitted control centers, bus casiowares, cabisles, syrichgens housing and other sheet motal assembling for utility and industrial plants — THE KIRK & BLOM MFG. 00.

858 ENDUGATION ROTORS — Quadenced fings and prices, from 16 hp, with complete descriptive information for all PRESIDENCE MATTER AND ADDRESS OF THE PRESIDENCE MOTORS. THE

870 EGEOTADO GARLES — Bulletta apcables, pescessing many edvantages from the
composite of installation, electrical operation, and design. Complete details as to dimanuface, maginering data and application.—
THE OCCUPATE COMPANY.

MIRCHLANBONS

1003 FLY ASE AND DUST COLLEGnourd Efficiency "Describes variations in the fly seh and dust problem and how they are met by tailored-to-the-job installations of carefully designed collection systems.— BUELL ENGINEERING OO.

1008 INDUSTRIAL INSULATION—Bulletin and Semples indicate the advantages of PO "foamglas" permanent industrial insulation, made up of millions of tiny glass bubbles that prevent moisture and vapor travel. — PITTHBURGH-OORNING OORF.

1010 WELDING AND BRAKUFE ALS.

Brasing Alexa Aluminum "—Gives complete information on Toungsten-Argum welds, very successful in over-increasing practice, Other types of welding and brasing aluminum.—LUMENUM COMPARY OF AREMICA.

1021 GRATING FLOORING — Bulletin flooring, fabricated without bolts, rivets or volds, in plant installations of flooring, walkways, platforms.—DRAVO OORF.

1035 UNIT MEATERS — Bulletin No.
1864 describes unit heaters which
give quick warm-up to meet andean changes
in weather conditions—borhontal and down
blow, non-ferrous heating elements, full pretortion against expansion strains and
giveace. — PEDDERS-QUIGAN OOEP.

1040 DUST EFFOUREY — Booklet, 23 pages — Outlines the theories and hasic principles of contribunal dust recovery, and the application of malti-close units, with their advantages of adaptability, space saving, high afficiency and low maintenance.—

1044 IEDUSTRIAL DESCLATION — Deon application, coverage, ungest and advatages of industrial insulating communiblecks, blankets, felts, fill meterials, pipe coverings, projective covarings anti-condensation compound and freproacing community to compound and freproacing communities compound and Ferromagnetic communities of the communities of the compound and freproacing communities to to compound and frequencing communities of the communiti

1046 STREET PARRICATERS - Bulletin describes plate, structural and tank februeston, on furnished by feer in places of furnished by feer in places of the feer in the feet of t

Casiloud on page 160

List Items You Want, Tear Out and Mail One of the Attached Gards Now!

Please be sere to fill in your Firm's Name and your position on the Coupen. This service cannot be extended to you unless this information is furnished.

750-1

Pleas, send me without obligation, free bookiets described in the July 1950 issue of SOUTHERN POWER AND INDUSTRY as circled below:

Alor send further information on following New Equipment (see pages 96-187) HI H2 H3 H4 H5 H6 H7 H8 H9 HIB HII HI2 HIS HI4 HIB HI4 HI7 HI8 HI9 H20 H21 H22

THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER, THE OWNE

ny Name

Zete S

Postage Willbe Paid by Addresses

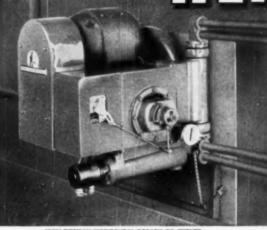


BUSINESS REPLY CARD

Equipment and Review Editor SOUTHERN POWER & INDUSTRY 806 Peachtree St., N. E. Atlanta 5, Ga.



ORON FOREMAN precision firing with



IRON FIREMAN HORIZONTAL ROTARY OIL BURNES

NO. 6 OR LIGHTER

Oil feed rate stays within 1/2 of 1% of setting, regardless of oil temperature or viscosity

America's most advanced burner for firing heavy fuel oil

The Iron Fireman horizontal rotary oil burner completely eliminates the troublesome viscosity factor in firing heavy oils. Oil-flow to nozzle is steady and uniform, metered with extreme accuracy by the Iron Fireman Oil Volumeter which is wholly unaffected by viscosity changes.

This makes possible the highest degree of precision in flame control attained in heavy oil firing. Perfect synchronization of oil and air volume produces efficient combustion, even

when throttled down to 10 per cent of capacity.

Every detail of this superb burner has been engineered with extreme care. Oil and air passages have been

carefully designed to assure efficient operation with low power consumption.

For further information write to Iron Fireman Míg. Co., 3247 W. 106th St., Cleveland 11, Ohio. Other plants in Portland, Oregon; Toronto, Canada. Qualified dealers throughout the U. S. and Canada.

IRON FIREMAN CIT. VOLUMETER

The Iron Fireman Oil Volumeter is a positive displacement, variable volume metering pump, completely submerged in the oil reservoir. It meters oil to the nozzle by regulating the stroke of its multiple pistons. No regulating valves or viscosity compensating device is required.

SYNCHRONIZED OIL-AIR CONTROL

Single control lever regulates oil, primary and secondary air. Correct fuel-air ratio maintained automatically through entire firing range. For manual, semiautomatic or full automatic operation,

FOUR PORT HINGE POST

Permits installation of hot water or steam oil heater in oil line on presure side of burner pump. No suction pumping of hot oil to form vapor locks.

OIL GAS COAL COMBINATION

Iron Fireman ring-type gas burner and pneumatic spreader stoker combine perfectly with rotary oil burner. Fuel change is accomplished in a short time without major alterations. Protects your plant against high fuel prices or shortages. Impartial Iron Fireman survey will help you determine which fuels are best fitted for your operation.





Here's insulation that will save you money

EAGLE-PICHER DE-85 BLOCKS

A highly efficient, rigid-type insulating material composed almost entirely of pure, lightweight, Eagle-Picher Diatomaceous Earth. High physical strength enables these blocks to stand up under usage normally encountered in installation. Adaptable to virtually all types of heated equipment. Can be cut with a knife, or sawed, to fit irregular shapes. DE-85 Blocks for temperatures to 1300 F. DE-95 Blocks for temperatures to 2000 F.

EAGLE-PICHER "99" FINISHING CEMENT

Finishing cement for temperatures up to 1000°F. Adheres tightly to hot or cold surfaces with practically no shrinkage. Highly durable. Gives a smooth, hard, light-colored, paintable surface

EAGLE-PICHER STALASTIC

(Boiler Wall Coating)

Effectively seals against air infiltration through boiler settings — seals cracks and pores, effects substantial fuel savings. Great adhesive strength, retains its elasticity. For temperatures up to 400°F.

An Eagle-Picher Industrial Insulation distributor or representative can help you reduce operating expenses because he has available a wide line of insulation products -- for high and low temperatures --

scientifically designed for maximum thermal efficiency, and practical application. Why not let him give you more information about some of the products listed here?

These Eagle-Picher products can save you money . . . power . . . time

Insulating Felts • Supertemp Blocks • Blankets Loose Wool • Pipe Covering • Stalastic • Insulseal • Insulstic Swetchek • Finishing Cements • Insulating Cements Fireproofing Cement - Diatomaceous Earth Blocks

THE EAGLE-PICHER COMPANY

General Offices: Cincinnati (1), Ohio

Insulation products of efficient mineral wool - for a full range of high and low temperatures. Technical data on request.

Since 1843

EAGLE-PICHER SOLD CO GOLD TO THE SOLD CO THE SOLD CO

EAGLE-PICHER SUPER "66" INSULATING CEMENT

Super "66" is all-purpose, rustinhibitive, extremely adhesive insulating cement. "Springy ball" pellets don't collapse after application . . . give great coverage, retain their thermal efficiency. 100 lbs. covers 65 sq. ft.—1 inch thick! Easily applied with trowel, over flat and irregular surfaces. Efficient for temperatures up to 1800" F. Reclaimable when used on equipment whose temperatures go up to 1200" F.

Get maximum
fuel savings and exact
temperature control
with these versatile,
efficient insulations

EAGLE-PICHER SUPERTEMP BLOCKS

Eagle-Picher Supertemp Blocks are lightweight (approximately 16 lbs, per cu. ft.). Can be cut easily with knife or saw to fit off-shaped areas . . . they fit snugly over minor irregularities. They're strong and have high refractory value. Withstand temperatures up to 1700° F. Conductivity at 512° F. approximately 0.43 . . . all standard sizes, from 3° x 18° to 12° x 36° . . . in thicknesses from 1° to 4°.

For a completely effective, low-cost insulation combination, you can't beat the teamwork of Eagle-Picher Supertemp Blocks, Diatomaceous Earth Blocks #85 (for temperatures to 1300°F.) and DE Blocks #95 (for temperatures to 2000°F.), Eagle-Picher Super "66" Insulating Cement, and Eagle-Picher Insulseal. They work effectively to give your equipment the highest possible thermal efficiency . . . cut operating costs by saving maximum amount of fuel . . . and help to provide perfect, precise control over temperatures.



EAGLE-PICHER INSULSEAL

A tough, weatherproof, protective coating for insulation. For temperatures up to 450° F. Applied as a plastic, its smooth troweling qualities assure uniform coverage, proper thickness. It protects insulation from air infiltration, fumes, rain, snow, vibration, punctures, and withstands severe service, indoors or out. Dries to a smooth, rich black, has a neat appearance on hot or cold surfaces . . . may be washed or painted.

THE EAGLE-PICHER COMPANY General Offices: Cincinnati (1), Ohio

Insulation products of efficient mineral wool—for a full range of high and low temperatures. Technical data on request.



Since 1843

Better piping for every job ...from one complete line...CRANE

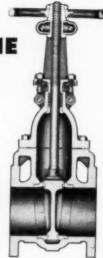
BUILT STRONGER TO LAST LONGER

That's one reason Crane 125-Pound Iron Body Wedge Gates find such wide application. Improved elliptical body design with uniform wall thickness eliminates useless weight; provides high resistance to pressure loads. Tie-ribs between end and bonnet flanges increase resistance to line strains.

Check these other Crane design features. Greater flow capacity: straight-through ports assure streamline flow. Minimum maintenance: long disc guides reduce disc drag and wear on seating surfaces. Deep stuffing box—more packing—lengthens packing life. Easy operation: uniform pressure on packing eliminates stem binding. Flexible T-head disc-stem connection prevents side strain on stem.

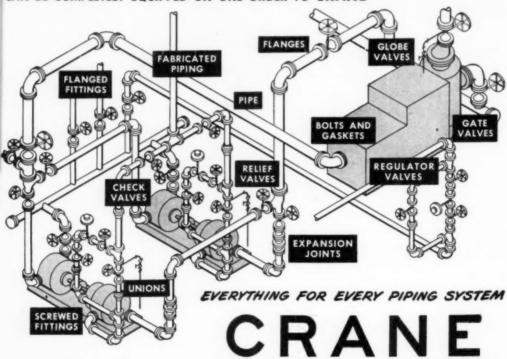
Available in patterns for every need; non-rising stem, O. S. & Y., Quick-Opening and Underwriters'. Flanged or screwed ends. See your No. 49 Crane Catalog.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas

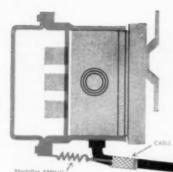


No. 465½, Flanged Gate Working Pressures: up to 125 pounds steam; 200 pounds water, oil, gas. 5izes: 2 to 48-inch.

THIS BOILER FEED SYSTEM, FOR EXAMPLE,
CAN BE COMPLETELY EQUIPPED ON ONE ORDER TO CRANE



VALVES . FITTINGS . PIPE . PLUMBING AND HEATING



ANOTHER"FIRST"

Now! Underwriters' Approval on Flexible Powerduct Cable



for use in Plug-In Bus Duct systems

Here's the Powerduct Cable that's making the Plug-In Bus Duct power distribution system more simplified, more flexible and more effective than ever. All over America, industry and contractors are using more and more of Anaconda's new Powerduct Cable. It provides service wherever it's needed—quickly—easily—at low cost. Connecting cable is always out of the way... never interferes with men or machines.

These are the reasons:

- It eliminates need for conduit—reduces cost of installations!
- Easier to handle!
- Handy grips won't let cable slip!
- Better cable appearance on completed installation!
- Withstands heavy mechanical abuse . . . and oils, acids, water . . . resists greases and cutting compounds!
- Gives Bus Duct system full flexibility!

POWERDUCT CABLE

CALLE GI

CONNECTO

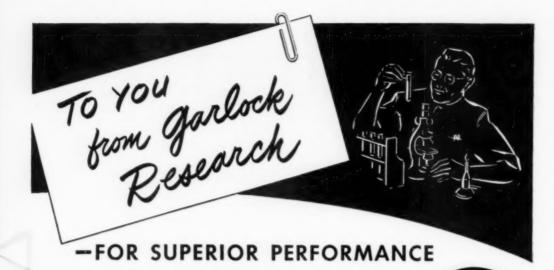
Get the details today on ANACONDA Powerduct Cable—the cable that's engineered specifically for these modern power distribution systems.

Ask your nearest Anaconda Sales Office. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.



WIRE AND CABLE





GARLOCK RESEARCH coupled with modern quality controlled manufacturing processes bring you Garlock Packings, Gaskets and Oil Seals which give superior performance consistently. A few widely used Garlock products are:

- GARLOCK Bitan* Leather Packings—tanned and treated by an exclusive Garlock process for severe service.
- GARLOCK Lattice-Braid—a patented braided packing, made of asbestos, flax or cotton—in which all strands are lattice-linked together into a sturdy and flexible unified structure.
- Garlock Guardian* Gaskets—spirally wound metal and asbestos—are extremely resilient. Recommended for use against the highest temperatures and pressures.
- 4. GARLOCK Cherron* Packing—an automatic packing made of asbestos or cotton base materials—accurately molded into rings of any size. Chevron packs high pressure jobs or low pressure jobs with minimum friction and wear.
- GARLOCK KLOZURE* Oil Seal Models 53 and 63—tough, durable, resilient. Complete range of sizes, including Metric O.D.

Write for folders

THE GARLOCK PACKING COMPANY PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Montreal, Que.



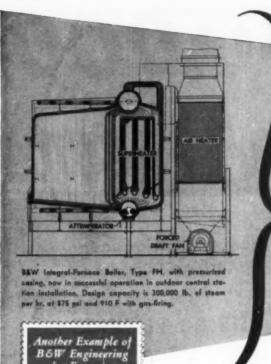








GARLOCK



PRESSIVE IEW ECONOMIES

for Economy

... improved principle of boiler-furnace operation pioneered by B&W offers major cost saving advantages

Demand charge for Induced-Draft fan capacity may run as high as one-half of one per cent of gross generating capacity . . . an appreciable expense to any central station. Maintenance, too, is excessive because of constant exposure to hot gases and entrained abrasive particles.

These reasons help explain the importance of B&W's latest development-pressurized furnace construction. ID fans can be eliminated and users assured of the four big advantages listed at right.

A creative approach to boiler design and application, working in close cooperation with far-sighted managements and power engineers, has identified B&W with steam-power progress for more than 80 years. Perhaps it's just what is needed to effect significant steam-generating economies in the solution of your present problems or future plans.

- Eliminates ID fan lowers demand charge.
- Prevents air infiltration-provides higher boiler efficiency.
- Simplifies draft control-permits quick, easy, effective adjustment to optimum combustion conditions at all loads.
- Simplifies design-lowers initial cost of duct and stack arrangement.

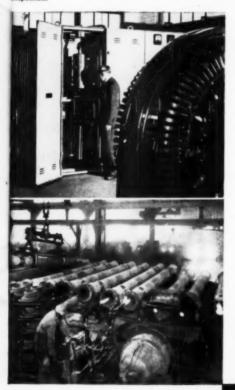


Helping Industry Cut Steam Costs Since 1867

G-485

\$30,000 back in 5 years

The 500-kw, 250-volt G-E rectifier at the Florence Pipe Foundry and Machine Company requires only periodic



The G-E rectifier provides the d-c power which operates the cranes, ladles, and centrifugal casting machinery in the Florence Company's plant.

Florence Pipe Foundry & Machine Company GETS LOW-COST D-C POWER

When the Florence Pipe Foundry & Machine Company needed additional d-c power in 1946, George E. Pfeffer, electrical engineer, looked for the best way to do the job. He learned that installing G-E rectifiers would save in three ways:

1. Installation costs-\$10,000 less

WITH G-E RECTIFIERS

The rectifiers were compact enough to fit into the present power house. Other types of generating equipment required the construction of a costly new building.

2. Operating costs-no new personnel needed

Because rectifiers need only periodic inspection, there's no need for standby personnel.

3. Power costs-\$600 a year less

The extra high efficiency of G-E sealed rectifiers saves about \$600 a year in power bills.

The combined savings will amount to \$30,000 in five years. That will pay for the rectifiers, and for the cost of installing them.

To Cut your Power Costs

Find out today how you can put G-E power rectifiers to work in your plant. Call or write your nearest G-E sales office for information. Apparatus Department, General Electric Company, Schenectady, N. Y.

G-E MERCURY-ARC RECTIFIERS MEAN LOW-COST D-C POWER

GENERAL (%)



ELECTRIC

80% of the Sales for 20 YEARS unless you give far greater value

In the past 20 years, "Power" has published 11 surveys of central station power plants. 83.7% of the soot blower installations in the plants listed in these surveys were Diamond Soot Blowers.

You don't get persistent percentages like that unless your product consistently gives your customers a much greater value per dollar. This is certainly overwhelming evidence of the outstanding superiority of Diamond Soot Blowers, Diamond Application Engineering and Diamond Service.

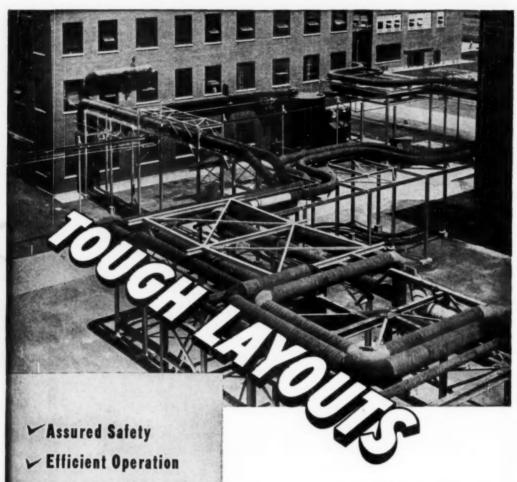
DIAMOND POWER SPECIALTY CORP.

LANCASTER, OHIO

Diamond Specialty Limited

Windsor, Ontario

DIAMOND Soot Blowers



- ✓ Minimum Fuel Costs
- Low Maintenance
- Long, Trouble-Free Life

MADE SIMPLE BY NAVCO

The high degree of skill acquired by Nevco Engineers from long experience in solving unusual Piping problems is your guarantee of an accurate and workmanlike Piping System.

Consult Navco for your next Piping Job



NATIONAL VALVE & MANUFACTURING COMPANY - PITTSBURGH, PA.

NEW YORK . CHICAGO . CLEVELAND . BOSTON . ATLANTA . TULSA . BUFFALO . CINCINNATI

expanding your

power system?



cost will surprise you.

Then estimate the labor and time saving you achieve with cable that weighs up to 30% less than insulated copper.

For names of manufacturers, and for a copy of "Questions and Answers about Insulated Aluminum Conductors" call your

For names of manufacturers, and for a copy of "Questions and Answers about Insulated Aluminum Conductors", call your nearby Alcoa sales office. Or write ALUMINUM COMPANY OF AMERICA, 1780G Gulf Building, Pittsburgh 19, Pennsylvania.

Aluminum Conductors



of ALCOA 🖾 ALUMINUM are made by leading manufacturers



has oxidation resistance unapproached by any other turbine oil!

Now more than ever it's the world's finest! The new improved Gulfcrest has oxidation resistance unapproached by any other turbine oil!

After extra refining by the Alchlor Process, Gulfcrest Oil is enriched with a remarkable new oxidation stabilizer - another important Gulf Research development. This additive greatly improves Gulfcrest's already outstanding chemical stability.

In actual field tests, including systems where oil temperatures are unusually high-and in accelerated oxidation tests in the laboratory, Gulfcrest has outlasted other quality turbine oils.

And-the new improved Gulfcrest Oil has been fortified to provide an even more effective rust preventive film. Now you can be sure that all oil bathed surfaces in your turbine lubricating system can be completely protected against rust. Gulfcrest Oil has highly preferential wetting

characteristics-displaces water quickly on the internal surfaces of the system. Then too, Gulfcrest Oil eliminates foaming.

Ask the Gulf Lubrication Engineer for complete details about the new improved Gulfcrest Oil, or write, wire, or phone:



Gulf Oil Corporation · Gulf Refining Company GULF BUILDING, PITTSBURGH, PA.

Sales Offices - Warehouses

Located in principal cities and towns throughout Gulf's marketing territory

SOUTHERN POWER & INDUSTRY for JULY, 1950





ARE NOW CLARAGE EQUIPPED



CAROLINA POWER & LIGHT

installs "HEAVY-DUTY" Mechanical Draft Fans

Again Clarage HEAVY-DUTY equipment is chosen for a large and important job!

Pictured above are the two forced draft and one of the two induced draft fans furnished for the new Lumberton (North Carolina) 120,000 horsepower steam electric generating plant of the Carolina Power & Light Co. Photos show fans aboard cars ready for shipment from our plants in Kalamazoo.

Each forced draft fan has a capacity of 158,300 c.f.m. at 10.3" pressure; each induced draft fan, 229,300 c.f.m. at 13.4" pressure and 320° F. The induced draft fans are of record large size.

Wheels, housings, bearings, supports, dampers - all parts of Clarage mechanical draft equipment are HEAVY-DUTY construc-tion beyond customary practice. If you want the best in the market, consult with us!

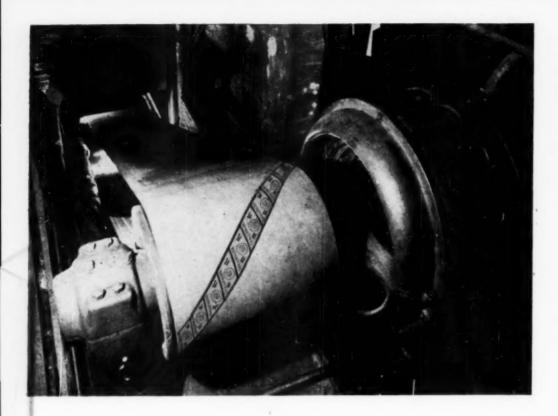
CLARAGE FAN COMPAN)

Sales Engineering Offices

September 30, 1949 at the Lumberton plant - the day the first 60,000 horsepower unit was placed in service. Second 60,000 horsepower unit scheduled for service June, 1950. Clarage fans and Babcock & Wilcox steam generating equipment serve both units.

-HEADQUARTERS for Air Handling and Conditioning Equipment

in All Principal Cities



for really efficient power transmission . . . it's Republic Rubber's hallenger Belting

No mistake about it. When it's a question of power delivery, the answer is Republic's Challenger Transmission Belting—the top performer of them all!

Challenger has been designed to handle your most difficult job. It's a flexible pre-stretched belt made of heavy, hard-woven, rubber-impregnated fabric for maximum service life. Challenger is an exceptional belt, being adaptable for long satisfactory service on heavy industrial drives subject to shocks and stresses, and also for drives operating at high speeds over small pulleys.

Challenger Belting is free from fastener

trouble, and both top and bottom surfaces have special non-slip friction for better pulley traction. The edges are sealed against moisture, fumes and other deteriorating factors. Challenger is also fabricated with heat-resisting compounds for special operating conditions.

Standard plies and widths are available in roll lengths or tailor-made to specified endless lengths. Consult your nearby Republic Distributor today about your particular needs.

Remember, Republic Rubber has been the specialist in the mechanical rubber goods field for more than 48 years.

Pioneers in the use of COLD RUBBER



LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN, OHIO

REPUBLIC RUBBER
DIVISION



TAYLOR FORGE

Yes, "WeldELLS have everything"... to make it easier

... better. Coupon brings lots of facts.

TAYLOR FORGE & PIPE WORKS • General Offices & Works: Chicago 90, Ill. (P.O. Box 485). Eastern Plant: Carnegie, Pa. Western Plant: Fontana, Calif. Datries Offices: New York: 50 Church Street. Philadelphia. Broad Street Station Bldg. Phttsburgh: First National Bank Bldg. Chicago District Sales: 208 S. LaSalle Street. Houston: City National Bank Bldg. Los Angeles. Subway Terminal Bldg. Please send a copy of your new welding fittings and forged steel flange catalog 484

Position			-
Company			
Street Address			
City	Zone	_State_	

PROCEDURES ARE

Easily Followed

IN HALL BOILER WATER CONDITIONING

Maintaining proper boiler water conditions is a day-to-day job, and requires the cooperation of the men in the plant. By making procedures simple, and by carefully training your own plant personnel, Hall Laboratories makes this maintenance a relatively simple matter.



Hall Laboratories supplies written instructions, prepared so that any man competent to operate a boiler can understand them.



Hall Laboratories has continuously worked to simplify the testing of boiler water. Hall engineers train your men to make these tests quickly and accurately.



You get better cooperation from men when they know not only what to do but why to do it. Hall engineers, therefore, explain recommendations to your plant personnel so that they understand the reasons for the procedures recommended.

Careful instruction of personnel is one reason why plants small and large, manned by trained engineers or by men who have come up through the ranks, have found it profitable to use Hall Service. Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

HALL LABORATORIES, INC.

(A Subsidiary of Hagan Corporation)

CONSULTANTS ON
INDUSTRIAL WATER TREATMENT
HALL SYSTEM OF BOILER WATER CONDITIONING
INDUSTRIAL WASTE RECOVERY AND DISPOSAL

34



Hall supplies forms on which control test data are reported. Review of these reports by Hall Laboratories gives assurance that the recommended procedures are being maintained.



Let's stop calling it an

"Agricultural Implement"

Plain talk is urgently needed today on a matter that affects the pocketbooks of all taxpayers...subsidies to commercial intercity transportation agencies that long ago outgrew the infant industry stage.

The yearly expenditures of the Federal Government alone...for aid to forms of transportation other than the railroads...now approach \$1½ billion. These are your tax dollars—and ours. They help provide the highways used by huge commercial trucks, the airports and other facilities used by commercial airlines, and the waterways used by waterway carriers.

In contrast, the railroads do not receive, and do not want, one single penny of subsidy. They are self-supporting. They pay more than \$1 billion a year in taxes. And their charges reflect their true costs of doing business.

We think it's time to call a spade a spade ... time to point out that these subsidized carriers can destroy but not supplant the self-reliant railroads ... time to urge that simple justice be done for the good of all America and all taxpayers.

Emest E. norris

President

SOUTHERN RAILWAY SYSTEM





JUST PUSH THE BUTTON

to put these powerful forces to work in your company

Right now management has an unusual opportunity to gain employee-relations value from the high public interest these genii have created for U. S. Savings Bonds. During the Treasury Department's Independence Drive, May 15-July 4, every major advertising medium has been used to broaden the people's interest in Savings Bonds as a means of building financial independence. Now, more than ever, as a result of this all-out campaign, your employees will appreciate the convenience of being able to obtain Bonds "automatically" via the Payroll Savings Plan.

If your company doesn't yet have the Payroll Savings

Plan, now's the most opportune time for you to install it!

If your company does have the Plan, now's the time to remind employees about it!

Employees who pile up money in Savings Bonds feel more secure...are actually better workers. Moreover, Bond sales build a backlog of future purchasing power good "business insurance" for all of us in the years ahead.

Payroll Savings is good for your employees, your business, and your country. "Push the button"—call in one of your top executives and appoint him Savings Bonds Officer. All the material and assistance he may need are available from your State Director, Savings Bonds Division, U. S. Treasury Department.

The Treasury Department acknowledges with appreciation the publication of this message by

SOUTHERN POWER & INDUSTRY



This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

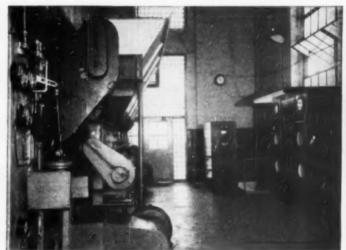
• the Municipal Electric Light and Power Plant of Hannibal, Missouri

the home of Mark Twein and his famous characters, Tom Sawyer and Huckelberry Finn



All essential boiler records and manual controls are centralized on the Republic boiler panel.

HAS THE **ANSWER TO LOWER** STEAM COSTS



liew of boiler room showing stokers and Republic boiler instrument and control panel.

A REPUBLIC automatic combustion control system that operates their boiler at test standards, 24 hours a day, is the answer.

Installed at the Hannibal municipal plant is a modern three drum, 90,000 lb. per hour, 400 psi boiler with forced and induced draft fans and fired by a traveling grate spreader type stoker.

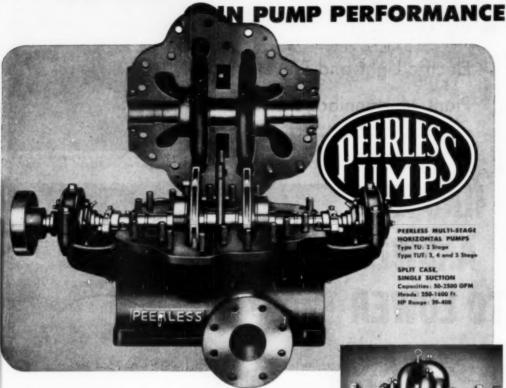
The REPUBLIC control system enables them to take full advantage of those economies which have been "built in" their boiler and its auxiliaries. It automatically increases and decreases simultaneously the fuel and air supply to the boiler in the correct amount to maintain constant steam pressure and in the correct ratio to maintain maximum combustion efficiency at all ratings.

The REPUBLIC combustion control system makes and co-ordinates these adjustments automatically, at the same time permits the operator to assume manual control from a centralized control point on the instrument panel whenever advisable.

REPUBLIC combustion control systems are designed and built for all sizes of boilers-all types of fuel firing-all load conditions and any arrangement of draft equipment. We will be glad to supply full information on REPUBLIC Control Systems - just write for Data Book No. S-21.

REPUBLIC FLOW METERS CO. • 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS

PEERLESS PROVIDES A PLUS



PEERLESS TYPE TU PUMP WITH THE CASE SPLIT FOR A LOOK AT CONSTRUCTION FEATURES

Peerless Type TU and Type TUT multistage horizontal pumps squarely meet your requirements where moderate capacity and high head applications in handling boiler feed water and process liquids are involved. In general, these pumps are of horizontal, split-case design. They incorporate a number of features that provide a plus in pump performance without paying a premium on your investment.

For example: Peerless TU and TUT pumps are equipped with duplex angular contact thrust bearings, water cooled bearing housings, heavy stiff case rings, sleeves locked against impeller hubs, in-and-out cooling and sealing connections at stuffing box.

The return passages from discharge to suction of the impellers is the best method developed over a period of years for converting velocity into pressure between stages providing a definite improvement in efficiency.

The high pressure stuffing box on these pumps is under one stage pressure only, regardless of the net pressure developed by the pump.

The spacer bushings between stages are serrated with grooves throughout its length, are longer than competitive pumps thus making an effective seal between stage pressures. The serrations allow closer clearances and minimize any tendency to bind.

Shafts are rugged for the HP involved and will bear comparison with conventional pumps.

Peerless Type TU and TUT pumps are described in Bulletin B-301. Write for your copy today.



Exterior view of Type TU 2-stage pump showing internal cross-over as furnished on



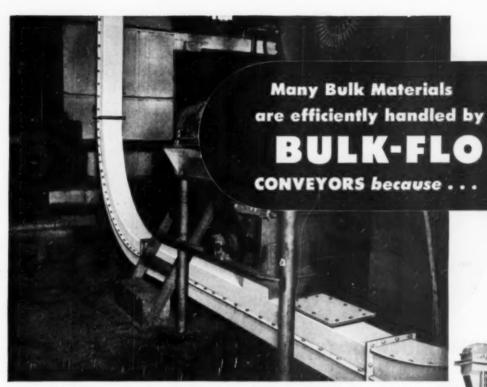
View in booster station shows Type TUT 3-stage pumps each handling 325 gpm of process water at 600 ft, head.



PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

Factories: Los Angeles, California, and Indianapolis, Indiana.
Offices: New York, Atlanta, Chicago, St. Louis, Phoenix, Fresno, Los Angeles;
Dallas, Plainview and Lubbock, Texas; Albuquerque, New Mexico.



- It is self-loading to capacity, requiring no separate feeder.
- It simplifies the layout one Bulk-Flo often serving where several other types of conveyors would be required.
- It is very compact, occupying minimum space.
- It operates slowly, moving the material in compartments, without churning action, thus assuring gentle handling of material with minimum power consumption.
- Most material can be conveyed whether the compartments are fully or partially loaded.
- It assures dust-tight operation, and minimizes degradation of material.
- If a vertical unit is operated for several minutes

- at the conclusion of a run, no appreciable amount of material will remain in the carrying run of casing.
- It permits the use of multiple feed and discharge points along horizontal runs of conveyor.
- Each conveyor flight substantially fills the area of conveyor casing, therefore prevents backward avalanching of materials on vertical runs.
- It is extremely flexible in its field of application, because of the various paths of travel possible and the ability of one Bulk-Flo to convey both horizontally and vertically or on an incline.
- Bulk-Flo equipment frequently costs less than that of other types of conveying and elevating apparatus required to accomplish the same function or purpose.
- A Link-Belt engineer will be pleased to discuss your problems without obligation.

LINK-BELT COMPANY

Chicago B, Indianapolis 6, Philadelphia 40, Atlanta, Mouston I, Minneapolis 5, Sar Francisco 24, Las Angeles 33, Seattle 4, Toronto 8, Offices in Principal Cities

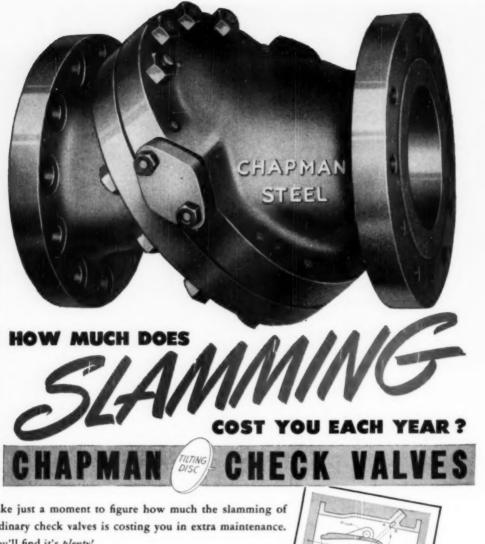
LINK BELT

BULK-FLO
Elevator-Conveyor-Feeder



Separated-run

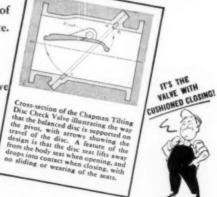
design, L-path arrangement Bulk-Flo with side-discharge or front-discharge head section for multiple feed points and where feed control and accessibility are essential.



Take just a moment to figure how much the slamming of ordinary check valves is costing you in extra maintenance. You'll find it's plenty!

Then switch to Chapman Tilting Disc Check Valves. You'll eliminate the slamming that causes those destructive pipe line stresses. Most of the wear on seats and hinges, too. And head losses will be almost 80% lower than for conventional type check valves.

Those features mean important savings. Yet there are many more. Write today for additional information.



The Chapman Valve Mfg. Co. INDIAN ORCHARD, MASSACHUSETTS

Timely Comments



Atlantic Steel Company's Dixisteel on Dixie Farms Open House Featured 35 Southern Agricultural Machinery and Equipment Manufacturers.

"Dixisteel on Dixie Farms"

Unique **Open House**

DEPARTING from conventional Atlantic Steel "Open House" procedure of restricting such occasions to exhibition of the host company's operations, the Atlantic Steel Company of Atlanta, Georgia, shared their

Dixisteel on Dixie Farms Open House in early May with a group of its customers. The objective constituted a new approach to the practice of having open house celebrations; namely, to invite customers, stockholders, civic leaders and employee families to witness steel in the making and to see the use of this steel in an important group of end products.

President Robert S. Lynch pointed out that in deciding upon a group of customers that would best demonstrate good customer relations, good employee relations and good public relations wrapped into one package, management could think of no more appropriate group than the Southern Agricultural Implement Industry.

"It is an industry that will be increasingly significant in our Southern economy, it has a bright future, and it particularly demonstrates the great variety and uses of the finished and semi-finished steel which Atlantic Steel produces.

"We are happy and proud to be represented in the Open House with this group of successful farm machinery and implement manufacturers. Companies from 33 different cities and seven states comprise this group, who use Dixisteel in their products, which are necessary to the growth and balance of our Southern economy."

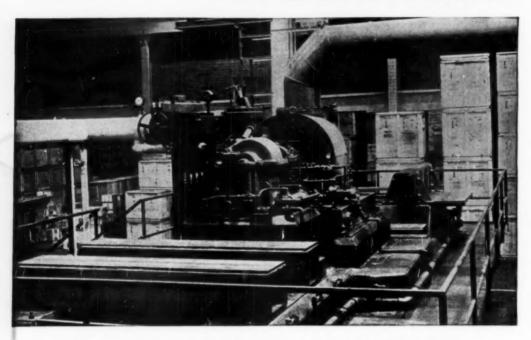
Plant Tour

In addition to the diversified array of equipment and machinery, Atlantic Steel's Open House included an extensive plant tour including open hearths, soaking pits, blooming mill, strip mill, wire and nail mills, galvanizing department, forge shop, and the warehouse division, which offers one of the South's largest varieties of steel products.

Rapid Growth

From its beginning in 1901, with one mill producing only cotton ties and barrel hoops, Atlantic Steel Company's facilities now cover almost 200 acres. The mill has three 72-ton basic open hearth furnaces. Ingot production has increased from 139,000 tons in 1940 to 176,000 tons in 1948, an increase of over 26 per cent. The plant now produces over 65 finished products and employs over 2,000 workers.

The TERRY TURBINE



Flexible POWER and SPEED In This Test Unit

This new test stand for air- and gas-compressors at the Carrier Corporation plant in Syracuse, N. Y. meets a wide range of power requirements with a special-purpose Terry Turbine. Compressors tested may require the delivery of as much as 2500 hp at speeds as high as 14000 rpm, or the same power at 6000

rpm. This wide variation in speed was met by Terry engineers with a single 6000 rpm turbine having a double shaft extension. One extension is for direct connection to a compressor operating at not over 6000 rpm. The other extension delivers power through Terry speedincreasing gears at speeds up to

14000 rpm. The result is a compact unit that represents an economical solution to a special problem. It is typical of what Terry engineers do regularly.

Any of our district representatives will gladly give you full information on a turbine for your special purpose.



THE TERRY STEAM
TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.



Industry Speaks

Progress in Materials Handling

BY R. F. BERGMANN
Vice President and Chief Engineer
Link-Belt Company

Abstracted from an address by Mr. Bergmann before a Materials Handling Conference sponsored by A.S.-M.E., and S.A.M. in Winston-Salem, N. C.

IN the field of materials handling, what has been accomplished in some 30 years, reduced to the simplest of figures? Through friends and associates in a number of basic industries, I took the trouble to get rough figures on hours of labor expended per ton or pound of finished products in 1950 compared with 1920. These are industries in which materials handling plays a considerable part, largely on conveyors but also on associated equipment. The results are surprising.

Without most of us realizing it, mechanization in the past thirty years has reduced to one-third the total hours of labor expended to produce an equivalent tonnage or volume of finished product.

There are outstanding examples where much greater returns have resulted, particularly in the newer mass production and highly specialized industries where greatly accelerated sales volume brought outstanding advances in mechanization. In other words, where the opportunities through mechanization have been the greatest, so have been the returns.

Cost of Moving Material

Few of us realize the tremendous amount of time, labor, and money expended in moving material during manufacturing or processing. In foundries, for instance, it has been determined that from 150 to 200 tons of material are handled to produce one ton of castings. This may appear to be extreme, but I have seen figures for agricultural implement manufacturing which indicate that 180 tons of material are handled for each ton of finished product. It has been suggested that a fair ratio for all manufacturing industry would be at least 50 to 1.

Taking another example from the foundries, over the years mentioned before, 1920 to 1950, the total direct and indirect labor per ton of finished castings produced has dropped from 140 man hours to 40 man hours. This is quite general throughout the industry. Some operations have done better than others. The more specialized the work, the greater the mechanization.

Equipment Investment

As to first cost or investment, it is almost impossible to compare such a system or plant with its counterpart of a generation ago. There just was no counterpart, so no reasonable comparison can be made. Moreover, the changes in dollar values of so many materials and services make this difficult. I can only state that this and thousands of other systems like it are daily earning or paying their way. This is true of both large and small plants.

Economic Value

During the past six months, many a materials handling system or mechanized plant has had to demonstrate its economic value on the basis of reduced volume operations, some for the first time. All of us in the industry have been watching this with interest, for there has been much apprehension and concern expressed over the high investments and fixed charges in such elaborately equipped and mechanized facilities. We can truthfully state that those which have been carefully planned and built and are capably managed or operated, have shown surprisingly low break-even points where selling prices in the industry have not been too seriously depressed.

I think it only fair to state that some of this is due to a rising output per man-hour. Rates of hourly pay, that rise year by year, add to pressures on industry to find ways to economize in the use of man-power. Pension costs, rising now, are an added incentive to get along with fewer workers. In five postwar years, American business has invested an estimated 70-odd billion dollars in new plant and equipment. That investment is beginning to show returns, and a further investment is still being made.

Rising output per man-hour through greater and greater use of machinery has helped this country achieve its steadily rising standard of living along with a gradual reduction in hours of work.

Aluminum Made in Texas

120,000 Kilowatts From Gas Engines



120 engines of the two cycle radial type are connected through vertical shafts to d-c generators that supply current to reduction pots

THE first aluminum ever made in Texas was poured February 11, 1950, in the Point Comfort Works recently placed in operation by Aluminum Company of America, near Port Lavaca.

The new plant consists of 25 buildings with approximately 18½ acres of floor space. Included among these buildings are the pot rooms where aluminum is made,

the engine rooms for the production of electric power necessary for making aluminum, a carbon plant, and various plant service facilities.

The covering of the production buildings represents the largest single application of aluminum industrial corrugated roofing and siding to date. The greater portion of the aluminum roofing and siding was fastened to the buildings by the stud welding process.

The modern, air conditioned office building contains about 15,000 sq ft of floor space. The brick structure includes such applications of aluminum as doors, windows, lighting fixtures, and trim and decorative effects. Among the many other applications of aluminum found at the works are the fence, lamp poles, and electrical conductors.

Since low cost electric power is an important consideration in making aluminum economically, the industry is constantly looking



ONE OF THREE ENGINE ROOMS, EACH CONTAINING 40 ENGINES. GENERATORS AND AUXILIARY E-QUIPMENT ARE LO-CATED ON LOWER FLOOR.

for new power sources. It was for this reason that the Point Comfort area, with its natural gas, was chosen for the construction of Alcoa's new reduction works.

Power Supply

Power for the production of aluminum at Point Comfort has its source in the natural gas fields of Texas. By means of generators driven by internal combustion engines, this gas is converted into the electric power required to make aluminum. It takes about ten kilowatt-hours of electricity to produce one pound of the metal.

Natural gas is delivered to the works at a pressure of from 400 to 500 lb per sq in. This pressure is reduced in two stages to 60 lb. Two 8 in. gas lines connect each

ABOVE — CLOSE-UP OF ENGINE SHOWING GOVERNOR, DISTRIBUTOR, LUBRICATOR, AND GAS VALVES, AND CYLINDER ARRANGEMENT.

RIGHT—STEEL ENGINE BASE WHICH HOUSES GENERATOR, MOTOR DRIVEN, SCAVENING AIR BLOWER IN FORE-GROUND. SCAVENGING AIR AND EX-HAUST MANIFOLDS ARE IN UPPER PART OF PHOTOGRAPH.

Below — Inside engine base showing 1000 kw, 667 volt, d-c generator. Slip hings provide 24 cycle power for engine auxiltaries.

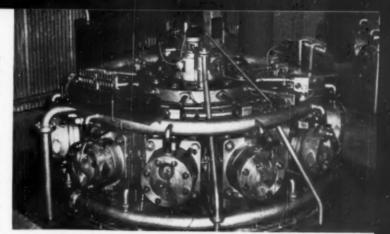
of the three power houses with the pressure reducing station. A regulator at each engine further reduces the intake pressure, and in actual operation, gas enters the engine at a pressure of about 6 lb.

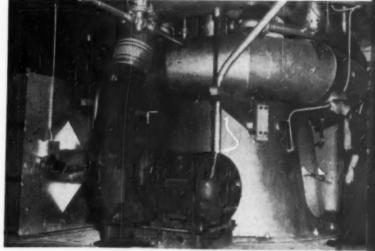
Each engine consumes gas at a rate of 13,000 cu ft per hr under load. Normally, the plant will use more than 30,000,000 cu ft of gas per day.

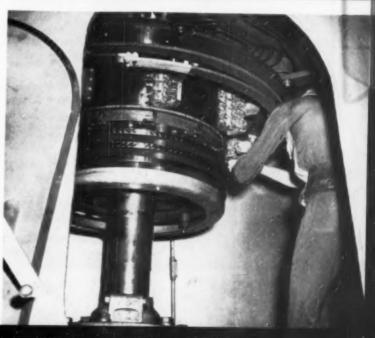
Nominal generating capacity of the power plant is 120,000 kw. Under normal operating conditions, the total output of the plant will be approximately 2,750,000 kwh per day.

Gas Engines

One hundred twenty enginegenerator units convert the gas into electrical energy. Forty units







are housed in each of three engine rooms, one for each pot line.

The engines are the two cycle, radial type, built by Nordberg Manufacturing Company. With slight modification, the engine can be adapted to gas, diesel fuel, or dualfuel operation.

The eleven cylinder engine has a 14 inch bore and a 16 inch stroke. At Point Comfort, the engines are normally operated at 360 rpm, producing 1600 horsepower. They operate at a thermal efficiency of about 29 to 30 percent.

The crankshaft is set vertically with the crank at the top. The cylinders are bolted radially to a cast frame, having a central hub that carries both the lower crankshaft main bearing bushing and also the thrust bearing which supports the load of the crankshaft. The heavy, bolted cover contains the upper crankshaft main bearing bushing. The governor, fuel pumps, mechanisms for gas operation, and controls are located on this cover. Circular manifolds for scavenging and exhaust are located in the lower level of the engine room. Intake and exhaust are timed by the pistons uncovering ports in the

cylinder walls, and no valves are

Balanced operation is accomplished by use of a master gear, a stationary gear bolted to the cover, two pinions and rotating counterweights. The eleven connecting rods are attached to the master gear by means of knuckle pins mounted in bronze bushed bearings. The master gear gyrates instead of rotating. There is no master connecting rod, commonly associated with radial type engines.

Two systems of lubrication are used. Motor driven, multi-feed lubricators deliver oil to each cylinder for piston lubrication. A circulating, pressure system provides oil for all other parts requiring lubrication and also for piston cooling.

When set up for gas burning, the engine operates on reduced compression, with spark ignition. Natural gas is admitted by cage mounted gas valves. The valves are operated by a cam on the crankshaft and are so located that gas is admitted into the path of incoming scavenging air. This assures thorough mixing and efficient use of the fuel. A valve inserted in the gas line and con-

trolled by a governor varies the amount of gas delivered to the cylinders according to the load on the engine.

Generators

The electric generators are located in the lower level of the power houses and are joined to the engines by direct coupling. Each engine-generator unit, with its auxiliaries, operates independently. Forty generators were supplied by each of three manufacturers: Elliott Company, General Electric Company, and Westinghouse Electric Corporation.

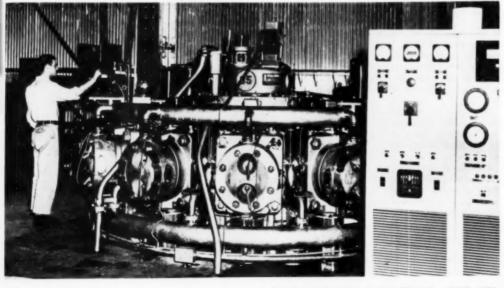
Each generator produces 1000 kw (d-c) at 667 volts and 125 kva (a-c) at 425 volts and 24 cycles. The a-c power is used for driving the engine auxiliaries. This eliminates the need for a common auxiliary power system and possibility of a total station interruption.

The generator is used as a motor in starting the engine.

Auxiliary Equipment

Each engine-generator unit has its own control panel, which includes engine protective equipment. Protective equipment

OPERATION IS HANDLED FROM THE ENGINE ROOM FLOOR. THE INDIVIDUAL ENGINE CONTROL PANEL IS SHOWN AT RIGHT. A CENTRALLY LOCATED MASTER CONTROL ROOM CONTAINS INDICATING AND RECORDING INSTRUMENTS FOR ALL UNITS, BUT STARTING AND STOPPING IS HANDLED AT THE INDIVIDUAL STATIONS.



causes the engine to shut off automatically for such reasons as low oil pressure, high water temperature, high exhaust temperature, overspeed, high generator temperature, or loss of auxiliary power.

In addition to unit control panels, each powerhouse has a master control room with recording and indicating equipment registering the operation of each of the forty engines and generators. No unit can be shut off from this master control room, but it provides a central point from which the operation of forty units can be observed.

Centrifugal type scavenger air blowers, which provide air under pressure to the engine cylinders, are driven by a 100 hp motor. These blowers supply air at the rate of 7,000 cfm.

The axial flow type, generator cooling air fan is driven by a 71/2 hp motor. The fan supplies air at the rate of 12,000 cfm. Along the wall behind each generator are the high speed generator switch gear, generator control, and starting equipment.

Air and Water Coolers

Combination oil and water. engine coolers were built by The Trane Company. Heat exchangers for the system are approximately 15 x 111/2 x 3 ft in size. The exchangers are all-aluminum in construction except for cast iron headers. Alclad aluminum alloy 3S is used for both tubing and fin stock. The tubes are arranged in banks of three with the water tubes in front of the oil tubes.

The tubes and vertical fins are joined mechanically. Each exchanger consists of four sections, which are independent of one another except for connection to a common manifold. Individual tubes may be cleaned or cut out of the system without interfering with the operation of the whole

An 84 in. diameter heat exchanger fan, having six adjustable blades, is driven by a 2 speed, 25 hp motor. Oil and water circulating pumps are driven by a common 15 hp motor.

Each engine room has forty all-aluminum units have housings each set which provides power

How Aluminum is Made

ALUMINUM is made by the electrolytic reduction of aluminum oxide. The Point Comfort Works will produce about 114,000,000 pounds per year.

The ore used is bauxite, which contains aluminum in the form of aluminum hydroxide. Much of the ore used in Alcoa's plants originates in Suriname, Dutch Guiana. In the United States, the principal source of ore is Arkansas.

Bauxite itself cannot be used for making aluminum. Pure aluminum oxide is obtained from the ore, and it is the oxide which is actually reduced. The Bayer process is generally used to refine bauxite. The bauxite is mixed with a hot solution of caustic soda which dissolves the aluminum hydroxide but not the impurities. The solution is then filtered and the impurities discarded. The filtered solution is then pumped into cooling tanks where pure aluminum hydroxide settles out in the form of fine crystals.

The aluminum hydroxide crystals are washed and fed into large revolving kilns and heated white hot to drive off the chemically combined water. What is left is white, powdery aluminum oxide, called alumina. Alumina is not made at Point Comfort, but it is the basic material used there in the production of aluminum.

Another important material in the production of aluminum is cryolite, a double fluoride salt. Alumina is dissolved in the molten cryolite in the reduction cells so that the oxide may be reduced by the electric current. Cryolite is found in the natural state only in Greenland, but its synthetic equivalent is made.

Aluminum is made in buildings known as "pot rooms". Several pot rooms normally comprise one "pot line", a reduction unit in which the electrolytic cells are arranged in series.

The electrolytic cell in which reduction takes place is a large, carbon-lined steel shell, commonly called a reduction pot. The pot is partially filled with cryolite, which is kept molten by heat from the electric current. Current is introduced through a carbon anode which dips into the molten cryolite. The carbon lining of the pot acts as the second electrode of the cell.

The continuous self-baking type anode used at Point Comfort consists of a large, single, rectangular casing mounted on the pot shell. A carbon paste is added to the casing from the top. The lower portion of the anode is baked by the molten cryolite and carries current into the cell. The baked carbon is consumed at the lower surface of the anode during electrolysis, and more paste is added at the top as required. The preparation of carbon paste for use in the pots is an important function of a reduction works, since approximately 16 lb of carbon is consumed for every pound of aluminum produced. The paste is made from petroleum coke dust mixed with hot pitch.

At appropriate intervals during reduction, alumina is added to be molten cryolite. Electric current flowing through the molten solution decomposes the alumina into its component parts, aluminum and oxygen. The oxygen combines with the carbon anode and the aluminum, being heavier than the cryolite, remains at the bottom of the pot where it is drawn off at scheduled intervals and poured into pig form.

14 x 5 x 5 ft in size. Each unit, containing thirty all-aluminum washer cells, has an air capacity of 35,000 cfm. Water is sprayed through the unit at a rate of 125

Sixty cycle, 4000 volt, alternating current is produced by four 667 volt d-c motor driven generator sets. This power is for general works use. There is also building air washing units. These a 250 volt, 250 kw generator on

for cranes throughout the works.

Each engine-generator unit has its own stack, which handles engine exhaust, generator cooling air, and the air from the heat exchanger. 71/2 ft diameter stacks. having an overall height of 50 ft. were made from 1/2 in. aluminum sheet. The all-riveted stacks were fabricated on the job.

Electrical Conductors

Practically all electrical con-

ductor in the works is aluminum. Approximately 5½ million pounds of aluminum bus conductor alone was used. The bus is arranged in three 5,000 ft circuits, each including one powerhouse and one pot line. The bus joints were made largely by the inert gas shielded arc method of welding, and a complete welding shop was set up on the site for this purpose. The main bus consists of 22 aluminum bars, each having a cross section ¾" x 10".

Aluminum wire, cable and conduit were also used extensively. Because of their resistance to atmospheric corrosion, aluminum towers and substations were used for the 4,000 volt, auxiliary power distribution system.

Except for short periods during World War II and in the early days of the industry, hydro-electric power has always been used for the production of aluminum in Alcoa's plants. Since low cost electric power is an important consideration in making aluminum economically, the industry is constantly looking for new power sources. The Point Comfort area, with its supply of natural gas, was chosen as the site of Alcoa's new reduction works because low cost electric power is very important in making aluminum economically.

The Lavaca Pipe Line Com-

pany, a subsidiary of Alcoa was organized for the purpose of operating the pipe lines necessary for gathering and distributing the gas to be used in the works. Gas is received from both on-shore and off-shore wells. One pipe line, built in the fall of 1949, runs between the Point Comfort Works and the Francitas Gas Company's re-cycling plant near Francitas, Texas. There are approximately 11 miles of 10 in. pipe and 51/2 miles of 8 in. pipe in this line. Another line, consisting of 71/2 miles of 8 in. pipe, ties into the off-shore line in Matagorda Bay.

The main underwater line, in Lavaca and Matagorda Bays, consists of approximately 14 miles of 8 in. pipe, about 12½ miles of it under water. In addition, approximately 9 miles of 4 in. and 6 in. pipe are used for the offshore gathering lines. The average depth of water in the gas field is about 14 ft.

Work on the off-shore line was started in April, 1948 and was completed the following October. The pipe was coated, wrapped and then welded in 1000 ft sections. Next, five of these sections were welded in 5000 ft lengths on dollies placed on greased launching tracks. River weights and buoys were attached to the pipe, and the sections were pulled into the water by tugs.

A control and metering station, built well above the water level, is located on a platform constructed of creosoted piling. The gathering system, which includes lines from eleven wells, leads to a 12 in. header on the platform; the header, in turn, discharges into the 8 in. transmission line.

Magnesium anodes for cathodic protection were installed at the shore end of the line, at the metering platform and at several intermediate points on the line.

One experimental gathering line consists of about 4,000 ft of 4 in. aluminum pipe instead of the steel pipe used for the rest of the system. One half of this aluminum line was left bare and the other half was wrapped in the usual way.

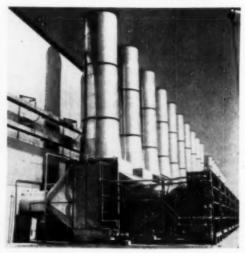
On-shore and off-shore lines terminate at the pressure reducing station located on the reduction works site. The system supplies the 30,000,000 cu ft daily requirement for gas at the works.

Note:
Design features of the Nordberg
Radial Diesel were discussed by
Emil Grieshaber, Chief Engr., Nordberg Mfg. Co., Milwaukee, Wis., and
Donald I. Bohn, Chief Electrical
Engr., Aluminum Co. of America,
Pittsburgh, Pa., in paper No. 50OGP-1 at the Oil and Gas Power
Conference in Baltimore, June 13.
Paper may be ordered from American Society of Mechanical Engineers, 29 West 39th St., New York
18, N. Y.

LINE OF ELECTROLYTIC CELLS WHERE ALUMINA IS RE-DUCED IN MAKING ALUMINUM, THE LARGE ALUMINUM CONDUCTORS SUPPLY CURRENT TO THE PARTS.



HEAT EXCHANGERS FOR COOLING ENGINE WATER AND LUBRICATING OIL. FIFTEEN FEET HIGH EXCHANGERS ARE ALL-ALUMINUM EXCEPT FOR HEADERS,





A WESTINGHOUSE ELECTRIC CORPORATION 10 KW RADIO FREQUENCY GENERATOR AND A WELDON-FLINCH-BADGH BATCH-TYPE HYDRAULIC PANEL PRESS ARE SHOWN IN OPERATION IN A SOUTHERN WOODWORKING PLANT. PRESS WILL HANDLE PANELS UP TO APPROXIMATELY 100 IN. LONG BY 40 IN. WIDE. IT IS CONSTRUCTED OF IBEAM MEMBERS AND IS CAPABLE OF EXERTING A PRESSURE OF 300 PSI ON 4-IN. THICK PANELS.

Making the Most of Wood Scraps

Current high lumber costs make utilization of "scraps" important. This case history offers interesting operating data, which will vary only slightly from plant to plant.

PROCEDURES established by a Southern woodworking plant have demonstrated how accumulations of wood scraps can be economically converted into stock for manufacture into such items as work bench tops, lumber core panels, door cores, desk top cores, and many others, by the use of radio-frequency glue setting equipment. Higher costs of lumber make the utilization of wood "scraps" of even greater importance now than in former years.

Illustrations show a Westinghouse Electric Corporation 10-kw radio frequency generator and a Weldon Flinchbaugh batch-type hydraulic panel press in operation. Daily production of panels from scrap stock in this Georgia plant averages 150 to 170 units with three press operators, but can be upped considerably by special pusher devices.

Operating Costs

A daily production of 150 panels (a low figure) of 22 board feet per panel (3,300 board feet) would have a value from \$650 to \$750, depending on the type of wood and its preparation. The estimated cost of such an operation is about \$125 per day maximum—resulting in a saving of \$525 per day. In one case a manufacturer glues scrap one day a week and uses the press for standard panels during the remainder of week, saving nearly

\$118.00



TO USE SCRAP STOCK, IT MUST BE SIZED TO WIDTH AND THICKNESS; THE LENGTH CAN BE RANDOM AS ILLUSTRATED, IN THIS OPERATION, STOCK BE 2 IN. WIDE AND 76 IN. THICK. A PANEL 37 IN. WIDE BY 90 IN. AND 76 IN. THICK IS BEING GLUED UP. PANELS PICTURED HERE REQUIRE ABOUT TWO MINUTES OVERALL IN THE GLUING PRESS.

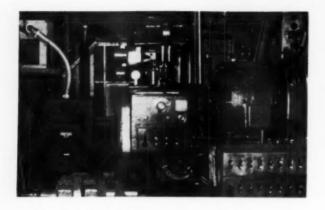
\$26,000 per year on this scrap operation alone. A breakdown of the cost of this operation shows approximate figures that change only slightly from plant to plant (see table).

At a total cost of \$116.00 per day, 3,300 board-feet of wood scraps are glued at a cost of 3.5 cents per foot.

Continuous panels the width of the press can be formed using this equipment. A cutoff saw can be mounted on the tail of the press, to be either automatically or manually operated.

Operating Costs

3 men operating press, 10-hour day	\$30.00
2 men operating planers, 1/2 time Glue cost per day for 3,300 board-feet	10.00
Cost of sawing, planing, and overhead	



NOTE THE SIMPLICITY OF THIS CAPACITOR INSTALLATION IN THE TUBE
TURNS, LOUISVILLE PLANT. CAPACITOR IS MOUNTED ABOVE THE DISCONNECTED SWITCH MARKED "SOUTH
LINE." CAPACITORS ARE NOTHING
BUT CONDENSERS ADAPTED FOR INDUSTRIAL USE, CONSISTING ESSENTIALLY OF STRIPS OF ALUMINUM OR
OTHER METAL FOIL SEPARATED BY
INSULATING PAPER OR FABRIC,
ROLLED OR FOLDED, AND PLACED IN A
SUITABLE CONTAINER FILLED WITH
AN INSULATION LIQUID.

Tube Turns Saves \$185 Each Month by Maintaining 97% Power Factor

At current rate, cost of capacitor installation in this Louisville, Ky., metalworking plant, will be paid off by savings within a period of 22 months. By James E. Barker

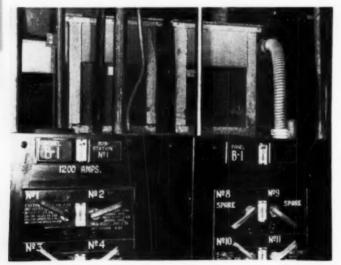
Design Engineer
Plant & Production Engineering
Tube Turns, Inc.
Louisville, Ky.

WE ARE all aware that power cost is one of the major items that figure into the final cost of a manufactured product. It is evident, therefore, that every manufacturer is striving to reduce this costly item.

The contract with the utility

company usually provides a power factor clause. A rate is established for the amount of electricity consumed at a stipulated power factor, such as 80% lagging, considering 100% as the unity power factor. A penalty or higher rate is applicable when the power factor falls below this figure, and a bonus or lower rate is applicable when the power factor is above this figure.

The basic policy of working toward cost reduction was adopted by Tube Turns, Inc., Louisville,



TWO CAPACITORS WERE EASILY MOUNTED ON TOP OF THIS SWITCH PANEL IN THE TUBE TURNS PLANT. CAPACITORS ARE NON-ROTATING DEVICES, SIMPLE, COMPACT, BELATIVE-LY LOW IN PRICE AND OPERATING COSTS, AND SIMPLE IN APPLICATION. THE LOSSES ARE VERY LOW, BEING LESS THAN ONE-THIRD OF ONE PER CENT OF THE RATED CAPACITY.

Kentucky. This made the reduction of power cost possible by improving the power factor. Tube Turns, Inc., like most other manufacturers, was required, during the war years, to make electrical installations in the quickest possible manner to serve the purpose.

These installations had to be made without consideration to the economy of operation. It was often necessary to change location of machines or add equipment to meet production requirements. This created a situation which made it practically impossible to maintain balanced loads or prevent excess loads on some of the circuits. The condition tended to produce a low power factor.

System Survey

When industry, after the close of the war, was recovering from the demands of war production and returning to normal production to meet the requirements of neglected projects and expansion programs, one of the first thoughts of Tube Turns, Inc., was reduce production costs. Power cost was naturally one of the subjects considered for possible reduction. Improvement in the power factor was deemed the best means to accomplish this. The power factor at this time was at an average of about 80%.

With the question of how to improve the power factor before Tube Turns engineers, it was decided to first make a survey of the system. The system consists of three banks of transformers with a total capacity of 4,995 kva. This is divided into twenty-two main circuits and then divided bus ducts or open feeders for service to the individual machines. The survey was to determine the size of conductors, size and types of motors, control equipment, transformers, lighting and accessory equipment, with their location on each circuit. The survey produced data from which it was possible to analyze and determine the conditions that were causing this low power factor.

Analysis

Some of the circuits were carrying a heavy load, while

minor loads were on other circuits. Specific locations were noted of large induction motors and transformers. Excess voltage on this equipment tends to increase the magnetizing current, that lends to a low power factor.

The difference between the estimated cost of making the changes in the system was compared with the estimated cost of installing capacitors and the difference in expected improvements of the power factor. The installation of capacitors was decided upon after these comparisons were made. It was further decided to utilize a number of 15 kva capacitors that were available from surplus of another branch of the firm. These capacitors were to be used by connecting three of them in series and placing them in a frame as a single unit.

The information obtained from the survey made it possible to select the locations that would be most suitable to install the capacitors. Eleven locations were selected, some of them to serve single motors and others to serve circuits feeding numerous pieces of equipment. The installation of these capacitors was completed in August 1948.

Results

The results proved an increase of the power factor to 97% during the first month of operation, after the capacitors were installed, and has been between 96% and 98% each month thereafter. The reduction in power cost created by this improvement of the power factor has amounted to an average of about \$185.00 per month. The cost of the installation of the capacitors will be paid off, at this rate, by the savings, within a period of 22 months.

A possible greater saving is realized by producing a more evenly balanced current on the conductors, controls and equipment and reducing energy losses due to heating effect from overloads.

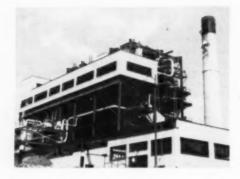


85,000,000 Houston Mill Nears Completion

The new Houston plant of A. D. Smith Corporation of Texas, which will manufacture large diameter welded steel pipe for the oil and gas industries, is being rushed to completion and will go into production in August.

The 675 ft mill building will have two 80 ft and one 40 ft craneway aisles extending the full length of the plant which is situated adjacent to Sheffield Steel Corporation's steel plant along the Houston Ship Channel. Smaller building in the foreground is the pickling building.

One of its first jobs will be production of pipe for a 30-in. transmission line, which will move natural gas from Texas to Chicago. Plant capacity is 35,000 tons of large diameter welded pipe per month.



REDDY KILOWATT, GLOWING IN NEON, 20 FF HIGH, AND ATOP THE 200 FT CONCRETE STACK, IS A SYMBOL OF TOWNERTE STACK, IS A SYMBOL OF THE 88,000 KW CAPACITY OF THE NEW LUMBERTON, N. C., STEAM ELECTRIC PLANT OF THE CAROLINA POWER & LIGHT COMPANY. OF INTEREST FROM AN ENGINEERING STANDPOINT IS THE SEMI-OUTDOOR CONSTRUCTION AS HERE APPLIED TO A COAL BURNING PLANT AND THE \$700,000 SAVED BY USING THIS SIMPLED CONSTRUCTION.

Aluminum Jacketing Solves Weather Protection Problem for C P & L -

RNGINEERS of Ebasco Services, Inc., have come up with a design which, it is believed, will guarantee continuous flow of water to the Lumberton plant of the Carolina Power & Light Company, in so far as freezing danger is concerned. The problem arose because the new 120,000-horsepower plant at Lumberton is of semioutdoor construction, and consequently many of the pipes are not housed.

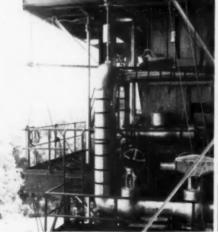
Aluminum weather-proof jacketing supplants the application of canvas ducking conventionally used for anti-freeze protection of plant piping.

Engineers, in solving the problem, first installed standard twolayer hot pipe insulation. Around this, they placed a layer of aluminum foil, secured in place by special tape. Next, electrical heating

cable was installed, either parallel to or wound around the insulated pipe. Next, a second layer of aluminum foil was placed over the heating coil, or cable. Principal function of the foil is to distribute the heat generated by the resistance wiring. Some 14,000 square feet of foil was used.

The second layer of aluminum foil was then covered by three layers of 1/4-inch asbestos roll board.

Over all this was placed a final weatherproofing of corrugated





THE CORRUGATED ALUMINUM JACKETING USED FOR THESE INSULATED
LIGHT COMPANY'S LUMBERTON
PLANT IS A PRODUCT OF THE CHILDERS MANUFACTURING COMPANY,
HOUSTON, TEXAS. APPROXIMATELY
14,000 SQ FT WERE USED ON THIS
JOB IN COVERING NEARLY TWO MILES
OF PIFING. 4 FT SQUARE SHEETS
(.005-IN. THICK) WERE WRAPPED
SECURELY AROUND THE ASSESTOS
ROLL INSULATION ON THE PIFING
AND FASTENED BY APPLYING SINGLE
TURNS OF 1½-IN. MINNESOTA MINING & MANUFACTURING PLASTIC
FILM SCOTCH TAPE.

aluminum sheets, held in position by special tape. The final aluminum jacket not only provides weatherproofing, but being highly resistant to oxidation, it will not corrode. Thus maintenance is reduced.

So, when and if a severe cold snap hits Lumberton, and if the thermal insulation is believed insufficient to keep the water liquid, all the engineers have to do is shoot a little juice through the special electric blanket.

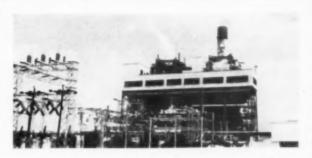
Plant Operating Data

The boiler of the new plant was designed and built by Babcock and Wilcox Co. for maximum continuous steam capacity of 425,000 lb/hr, Design pressure is 1500 psi and pressure at the superheater outlet is 1350 psi. Final total steam temperature is 955 F, while feedwater temperature is 410 F.



Boiler has tangential water walls throughout, and has but one drum which is located at the top front, in accord with the latest trend in radiant boiler design. A

These general views show the extensive use of Children alluminum weather-proof aluminum Jacketing in the Lumberton plant, Jacketing is a light sheet of aluminum, corrugated for extra strength and easy application and backed up with a gluedon asphaltic moisture barrier. Minnesota Mining & Manufacturing tape was used for attaching in this installation. Other applications utilize aluminum strapping and seals.



Carolina Power & Light's Lumberton Plant

Only the turbines, generators, condenser, and the controls of Carolina Power & Light Company's Lumberton plant are fully enclosed.

The two, 45,000 kw, hydrogen cooled, G. E. turbines, the directly connected generators, control panels, and the condenser are in a concrete building located between the transformer yard and the boiler.

The coal bunkers, the pulverizers, the pumps, and the heaters are covered by a roof, but the boiler, itself, is completely exposed. This outdoor construction will, no doubt, require extra maintenance, but it takes a lot of painting to add up to the \$700,000 saved in construction costs.

primary and a secondary superheater are included in the design and an economizer and air pre-

James S. Newbold, superintendent of the Lumberton plant, is shown at the Boller control panel. Carolina Power & Lighthave their headquarters in Raleigh, N. C. Plant was designed and constructed under the direction of Ebasco Services, Inc., with George E. Chamberlin as engineer in charge. John W. Clarke, also of Ebasco, was resident engineer encounser.

heater are located in the breaching leading to the stack.

Fuel reaches the plant by rail, and a car shake-out is used to drop it into a bunker located below the track, A belt conveyor carries it to a crusher located in a separate building, and another belt conveyor lifts it to the bunkers above the pulverizers. Piping runs from the pulverizers to three burners located one above the other on the face of the boiler. Ash is removed from a grate below the tubes.







Located near the business section of Dallas, Texas, the \$5 million Alford Refrigerated Warehouses is considered the largest and most unique refrigerated storage area in the world. Vast project consists of two identical units, 1650 ft long and 250 ft uple. Dry storage warehouse, fled at 60-70 F, and cooler and freezer units, cover an area of about 20 acres. The 70,000 sq ft air conditioned office building, visible at the far end of the warehouse, contains a 400 seat auditorium utilized for demonstrations and meetings.

Twenty Acre Refrigerated Warehouse

Over 800 Tons of Refrigeration Provides Cooling for World's Largest Refrigerated Warehouse in Texas

POR the past three years engineers have closely followed the construction of the unique and fabulous Alford Refrigerated Warehouses in Dallas, Texas.

A short time ago, Elliott R. Hallowell, vice-president in charge of engineering for the Alford organization, authored an extensive description of the project for the American Society of Refrigerating Engineers.

With the cordial permission of the society and its official publication, Refrigerating Engineering, this abstract features a few of the warehouse and refrigeration innovations incorporated in the vast project by Fred P. Alford, owner, and E. R. Hallowell, technical man in charge of the operation. M. C. Kleuser & Associates were the architects, and David C. Pfeiffer of Dallas was retained as electrical consultant.

Fabulous 85 million one-story project, near the business section of Dallas, Texas, features new methods of warehouse construction, unusual refrigeration design, and the utilization of mechanized handling.

Costing more than \$5 million, The Alford Refrigerated Warehouses is considered the largest and most unique refrigerated storage area in the world. The vast project, near the business section of Dallas, Texas, consists of two identical units, 1650 ft long and 250 ft wide, each having continuous 15 ft railway and truck loading docks running the full length along each unit. The dry storage warehouse, held at 60 - 70 F, and cooler and freezer units, cover an area of about 20 acres.

The roof is extended to form a 20 ft wide overhang covering the docks. A 100 ft wide paved street separates the 7,500,000 cu ft refrigerated warehouse and the 8,000,000 cu ft dry storage volume. Each warehouse provides space for 40 railroad cars at dockside and space on the outside track for an additional 40 cars, or a total of 160 cars for the two warehouses.

Many unique construction methods were employed. Floors were laid with street paving machinery, walls and roofs were built up of sprayed concrete; and aluminum was used as a heat reflecting material for the final roof covering. The project includes a modern windowless 4 story air conditioned office building and an auditorium seating 400 persons.

The entire operation utilizes

mechanized handling equipment, and in the design care has been exercised to make this practical.

The 1650 ft x 250 ft warehouse buildings have steel columns placed on 50 ft centers lengthwise and 55 ft centers across. These support steel trusses which span 55 ft, are 7 ft deep, and are placed from column to column. Supported between main trusses are 5 ft deep cross trusses on approximately 18 ft centers. Ten-inch deep bar joists span the 18 ft between cross trusses on 30-in. centers—and these support the roof.

All steel was prefabricated and trusses were bolted to columns on the job. No riveting was done on the site. Since the buildings are large, expansion joints were placed at regular intervals.

The roof pitches a total of 2 ft toward the street and allows an average ceiling height to the underside of the bar joists of 25 ft. The roof deck is concrete on top of the bar joists. To facilitate nailing and to provide an insulation break, a 2 x 2-in, wood strip was fastened on the tops of the bar joists. Pittsburgh Steeltex (a wire mesh with paper backing) was stretched over the bar joists. The mesh reinforces the concrete, and the paper served to keep the concrete from coming through before setting.

Concrete was applied by the Gunite process using a premixed charge of sand and gravel. The mixture was fed from the gun into a hose line and conveyed by air to the point of application, where water was added and the resultant wet concrete blown onto the roof. By this method, single crews could lay from 400 to 500 sq ft of concrete per hour at a thickness of 1½-in. The roof deck was then treated with asphaltic primer followed by a layer of 15 lb felt, and two layers of .044-in. Reynolds Metals Company embossed aluminum roofing.

Walls and partitions were similarly constructed, but as they do not carry a load, less strength was required.

Insulation

Shredded redwood bark was selected for insulation. Large quantities were needed and low first cost was necessary as well as lasting qualities. Since cost was not high, the dry storage areas held at 65 - 70 F were insulated along with the regular cold storage buildings.

Installation was handled by means of conventional cotton blowers discharging into a 4-in. metal hose. Wall construction contained about 12-in. of space which was filled with insulation. Before insulating and placement of the inner wall in the cold storage spaces, all corners and junctions were sprayed with an asphalt emulsion as a vapor barrier. The entire outside wall surface was sprayed with a double coat of rubber-base paint as an additional vapor seal.

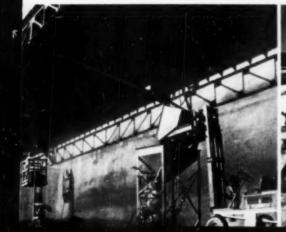
Ceiling insulation was handled in a simple manner. Reynolds Metals Company's Freuhauf corrugated aluminum sheets about 30-in, wide and 10 ft long were placed between the bar joists on the ledges formed by the bottom angles of the bar joists to form the ceiling. Shredded redwood bark was blown in the air space of approximately 12-in.

Door frames for the cold storage rooms were built of redwood lumber. An outer heavy door for each opening slides up between guides. Behind the sliding doors are two sets of swinging doors to form an air lock for the freezers. Schoelkopf Co. air openers are actuated by electric eyes. All vaults have two sets of doors for in and out traffic.

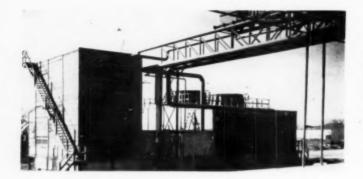
Total volume of cooler and freezer space is approximately 7.500,000 cu ft and load calculations gave a load of 236 tons for the freezers and 134 tons for the coolers, including product load. The office building is air conditioned and the dry storage building air cooled. The sum of these two loads amounts to approximately 350 tons. One hundred tons refrigeration was also added to provide ice for car icing. Thus the total load was calculated as 820 tons refrigeration. Plant engineers interested in the technical details of refrigeration load calculations are referred to Vol. 57, No. 1, Refrigerating Engineering.

A fleet of 20 Clark Equipment

CLARK FORK TRUCKS PROVED QUITE SERVICEABLE DURING THE CONSTRUCTION PERIOD. IRON PIPE SCAFFOLDS BUILT TO FIT THE FORKS CARRIED THE NOZZLE MEN WHILE GUNITING THE SIDE WALLS. THEY SERVED AS WELDING PLATFORMS IN THE ERECTION OF PIPE LINES AND ALSO AS PAINTING PLATFORMS. VIEW AT THE RIGHT SHOWS HOW CONSTRUCTION ENGINEERS UTILIZED A ROAD PAVING MACHINE TO LAY NEARLY 20 ACRES OF FLOOR SPACE IN A FRACTION OF THE TIME THAT CONVENTIONAL METHODS WOULD HAVE TAKEN.







TWO COOLING TOWERS ARE UTILIZED; ONE FOR CONDENSER WATER AND ONE FOR ENGINE JACKET COOLING, FORMER IS A MARLEY CROSS-FLOW INDUCED DRAFT TOWER WITH A CAPACITY OF 4500 GPM. ENGINE COOLING TOWER ON THE LEFT IS A 1000 GPM LILIE-HOFFMAN FORCED DRAFT UNIT. PIPE BRIDGE IS MADE OF 14-IN. AND 8-IN. COOLANT PIPES.

Company battery-powered and gasoline powered fork trucks of 4000 lb capacity and 1 Hyster 15,000 lb capacity truck help streamline materials handling operations.

Battery power is used for the trucks operating in the cold storage rooms, since rooms are unventilated. Exide batteries are used in all trucks. Charging is accomplished with a Hertner multiunit charger.

The Clark fork trucks proved

quite serviceable during the construction period. After the floor paving was completed the trucks unloaded and distributed material from cars. Iron pipe scaffolds built to fit the forks carried the nozzle men while Guniting the side walls. They served as welding platforms in the erection of pipe lines and also as painting platforms. Very little built-up scaffolding was necessary for the entire construction because of the use of the roving scaffolds on the trucks.

Unit Loading

A minimum of work is done inside cold rooms since palletizing and unloading of pallets is all done outside the rooms where workable temperatures increase efficiency. Full utilization is made of the fork truck-pallet system of unit loading. A fleet of 20 Clark Equipment Company battery-powered and gasoline-powered fork trucks is employed for all conventional storage operations.

Principal Equipment Alford Refrigerated Warehouses—Dallas, Texas

Plant Analysis

The following basic design features were established from a detailed analysis made to determine the most efficient and suitable equipment for the plant:

 Ammonia was chosen as the best refrigerant for a plant of this size. Long suction lines are necessary and these could be relatively small with ammonia. Oil presented no particular problems with the use of ammonia. First cost was not excessive. Absolute dryness of lines after fabrication was not essential. With welded lines and connections, ammonia is not difficult to hold.

Calcium chloride brine was chosen for part of the coolers and ammonia direct expansion for freezers and balance of the coolers. Some products held in coolers might be subject to damage in the event of even a slight



A FLEET OF 20 CLARK EQUIPMENT COMPANY BATTERY-POWERED AND GASOLINE-POWERED FORK TRUCKS OF 4000 LB CAPACITY AND 1 HYSTER 15,000 LB CAPACITY TRUCK HELP STREAMLINE MATERIALS HANDLING OPERATIONS. BATTERY POWER IS USED FOR TRUCKS OPERATING IN COLD STORAGE ROOMS, SINCE ROOMS ARE UNVENTILATED, FULL UTILIZATION IS MADE OF THE FORK TRUCK-PALLET SYSTEM OF UNIT LOADING.

COOLING OF FREEZING SPACES IS PERFORMED BY "RECOLD" UNITS. ALL UNITS ARE OF THE SAME SIZE AND ARE USED IN MULTIPLE AS NEEDED FOR VARIOUS TONNAGES. BY CLUSTERING THE UNITS NEAR THE CEILING, GOOD AIR CIRCULATION IS OBTAINED WITHOUT THE USE OF DUCTWORK.



refrigerant leak, so it was felt that brine should be used. Chances of damage in a freezer room from a refrigerant leak are slight and therefore ammonia as a direct refrigerant is acceptable.

5. Forced air units were selected to cool all rooms. From a structural standpoint, the building could be of lighter construction due to the absence of weight from pipe coils. From a performance standpoint, positive circulation of air eliminates dead spots; smaller temperature differences between air and refrigerant result in higher humidities in rooms and consequently less dehydration of storage products; defrosting is concentrated and made easier and faster; temperature may be closely controlled; and the refrigerant charge for the plant is materially reduced.

Suction Pressures

A considerable advantage was found in favor of a booster system for the low temperature suction as it afforded savings in power and equipment. Suction pressures finally arrived at were:

Low suction from freezers ____0 psig (—28 F Ice plant suction ____20 psig (5.5 F) Brine cooler suction and intermediate pressure for booster ____25 psig (11.3 F) Water chilling for air conditioning load _____50 psig (33.8 F)

The same pressure is used for the booster discharge pressure and for the brine cooler suction. This pressure is not optimum for top economy but was used since such a pressure was needed for the brine cooler suction, and an additional suction and further splitting of machines was not felt justified.

Type of Power

A theoretical year's operation was analyzed in which all power, including compressors, auxiliaries, lights, and miscellaneous items, was set up month by month as to total power requirement. It was found to be desirable to use natural gas as a fuel for internal combustion engine drives rather than purchase electric power. A detailed analysis showed that there would be an advantage in this installation, to use natural gas engines to drive compressors directly and also drive generators for the manufacture of electric power for the entire plant. Account was taken in the analysis of the cost of engine equipment and maintenance as compared to electric motors.

Compressors

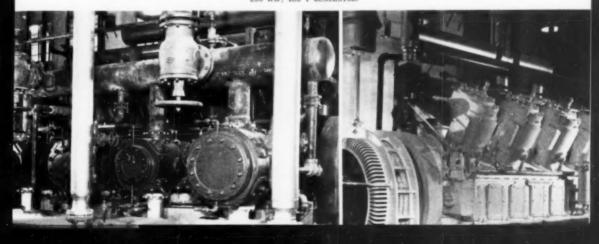
Four main compressors are Ingersoll-Rand XVG, heavy duty V-type, natural gas internal combustion engines combined integrally with ammonia compressor cylinders. All compressor-engine units operate at a maximum speed of 350 rpm.

Two of the units consist of eight-cylinder, 300 hp engines driving four ammonia cylinders; the third unit consists of a six-cylinder 225 hp engine driving three ammonia cylinders; and the fourth unit is a six-cylinder 225 hp engine driving three ammonia cylinders.

Safety features include high water temperature, low oil pressure, and overspeed cutouts. All ammonia cylinders are equipped with high pressure cutouts. Automatic gas valves are provided to cut off the flow of gas in case of engine stoppage.

Three other compressors are installed as standby units. These consist of two York 9 x 9-in, compressors driven at 180 rpm by Continental high speed natural gas

AMMONIA COMPRESSORS AND GENERATORS.—THE ILLUSTRATION AT THE LEFT OF INGERSOLL-RAND 8 XVG AMMONIA COMPRESSOR-ENGINE UNITS SHOWS ARRANGEMENT OF COMPRESSOR CYLINDERS WITH SUCTION AND DISCHARGE DRUMS, POWER IS SUPPLIED BY THREE GENERATOR SETS, CONSISTING OF AN INGERSOLL-RAND TYPE PVG 8 CYLINDER, 375 HP GAS ENGINE DIRECT CONNECTED TO AN ELECTRIC MACHINERY MANUFACTURING CO.



engines and one Frick 9 \times 9-in. compressor driven at 300 rpm by a Continental engine. These units are piped into multiple headers so they may be used as desired on any suction pressure during peak load conditions.

Starting the Ingersoll-Rand units is accomplished by means of compressed air. An air compressor and tank with dual drive is installed in the engine room and air is piped to the engine. Drive consists of a gasoline engine on one side of the compressor (in case of a complete shutdown), and an electric motor on the other side. Battery starting is employed for the Continental engines.

Headers

All ammonia headers in the engine room are carried at one side on racks one above the other. These headers range in size from 2 to 12-in., and are arranged to facilitate accommodation of lead-in pipes.

All suction headers are insulated with molded Fiber-glas insulation and covered with a vaporproof felt paper bonded with hot asphalt.

The ammonia pump-out line is actually a general utility line and has been connected to every piece of apparatus in the ammonia system on both low and high sides and can thus be used for any emergency.

Ammonia Condensers

There are 9 Frick horizontal multipass ammonia con-There are 9 Frick horizontal multipass ammonia con-densers, each containing approximately 1000 sq ft of sur-face in four water passes. They are racked on stands and are arranged three condensers high by three wide. Sur-face is in excess of 10 sq ft per ton refrigeration at peak conditions and considerably greater under average con-ditions. Five hundred gpm of water is circulated through each shell each shell.

Each condenser is equipped with inlet drain, purge, pump-out, and dual safety relief valves. Each vertical group of three condensers is connected to inlet and drain headers which are, in turn, connected to the main headers.

Receivers

Two Frick receivers 36-in. diameter x 18 ft long are located below the condensers. Both are equalized and can be operated at the same time. Dual safety valves are provided. All safety valves from high pressure equipment are piped into a header and discharge above the roof.

Oil Separators

The plant has 1 Frick high pressure oil separator located in the discharge line and another Frick liquid line unit located in the main liquid line from the receivers.

The latter consists of a large drum into which the liquid ammonia flows. The tank is baffled and the ammonia passes through at low velocity. A cooling coil is located in the tank and ammonia is expanded into this coil. Cooling action allows the oil to separate from the liquid ammonia and it is then drained off. liquid ammonia and it is then drained off.

Intercoolers

A Frick combination gas and liquid cooler, 36-in. diameter by 8 ft high and equipped with float control and liquid cooling coil, is used between the booster and high pressure stages of the ammonia system.

An ammonia accumulator, equipped with a float switch near the bottom, was installed in the low pressure suction line in the engine room. All low pressure gas passes through this before entering the machine header. In case of liquid return from the freezer rooms due to a faulty float or other cause, the liquid will be caught in the accumulator and the float will turn on a warning light. A liquid coil is located in the accumulator and liquid from the main line may be by-passed through it to boil off any liquid which may have accumulated from the low side.

Brine and Water Coolers

Four horizontal multipass coolers are used for brine and water chilling. Control is accomplished by an Alco float switch and solenoid valve. A back pressure valve is also located on each suction line to prevent possible freezing from low evaporator pressure.

Surge tanks for brine and water are above the roof level. A float valve maintains water level for the chilled water system. For the brine system, a small make-up tank is located in the engine room in which brine may be

Weinman pumps are used for water and brine circu-ion. There are four chilled water pumps and three lation. brine pumps.

Purger

An Armstrong automatic purger has been installed at the condensers for purging the system of inert gases dur-ing operation. Gas may be drawn either from the condensers or receivers.

Cooling Towers

There are two cooling towers; one for condenser water and one for engine jacket cooling. The former is a Marley cross-flow induced draft tower with a capacity of 4500 gpm through a 6 degree range with an approach to wet bulb temperature of 7 degrees based on a 78 F wet bulb temperature.

The engine cooling tower is a 1000 gpm Lilie-Hoffman forced draft tower. Duty on this tower is light since the water must be cooled to only 100 F through a 20 degree F range.

Cooling towers are set on concrete foundations and are equipped with concrete sumps. The pumphouse located between the cooling towers is adjacent to the sumps and suction headers from the towers to pumps are run directly from the sumps.

Condenser pumps consist of 4 Ingersoll-Rand 1125 gpm side suction pumps equipped with 30 hp motors, and 1 Allia-Chalmers pump of 1000 gpm capacity for use as a spare. A small Weinman pump of 250 gpm capacity also takes suction from the condenser water header and pumps water to the compressor jackets and engine oil coolers.

Engine cooling tower pumps consist of 3 **Weinman** pumps; one with a capacity of 600 gpm and two with 400 gpm. Total circulation is 1000 gpm and one 400 gpm pump is for use as a spare.

An Elgin water softener with a capacity of 100 gpm is used to soften all makeup water for the two towers.

Electrical System

Electric current for the entire plant is generated by 3 Electric Machinery Manufacturing Company 250 kw. rpm, 0.8 pf generators driven by 8 cylinder Ingersoll-Rand PVG engines rated at 375 bp. Generator rotors are mounted directly on an extension of the engine crankshaft and the exciters are V-belt driven and mounted on top of the outboard bearing for the engine crank-shaft extension.

The main switchboard was furnished by Electric Machinery Manufacturing Company and consists of 3 generator panels and 2 distribution panels.

All current is generated at 480 volts and distributed to various parts of the building through 2 distribution panels mounted adjacent to the main switchboard. Each panel contains 6 circuit breakers with a capacity of 200 amp each. There is also an auxiliary panel containing 4 time-totalizers giving the total hours run on the 4 main compressor engines, a tachometer with 4 position indicator for checking compressor speeds, and various indicator lights.

Distribution lines are carried outside the buildings under the canopy. Distribution to the cold storage rooms, dry storage, etc., is made through 15 and 25 kw stepdown transformers

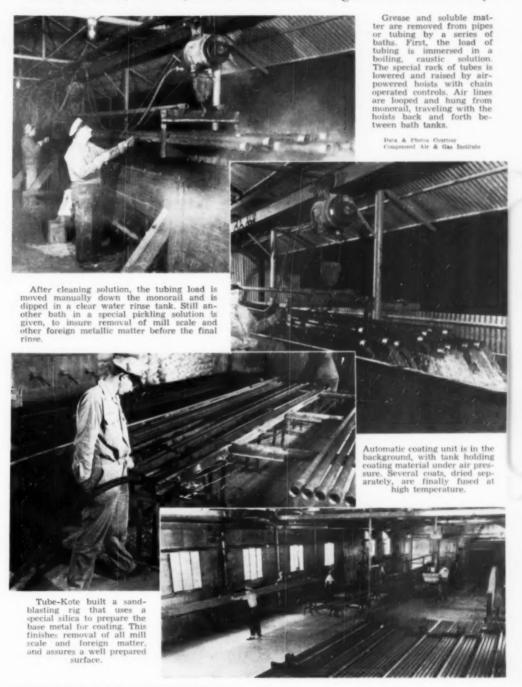
The 480 v circuits are in conduit. Wiring inside cold storage rooms and in the dry storage building is open knob and tube construction. Due to moisture problems prevalent in cold storage rooms, it was decided that the open type wiring would be subject to less trouble than any other type. Ceilings are high, and wiring is not subject to mechanical damage.

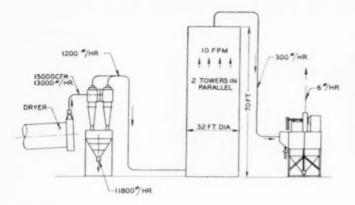
All small fan motors and solenoid valves are connected with plugs and receptacles, so, in case of failure, they may easily be disconnected.

Weatherproof combination starters were used for the cooling tower fans with auxiliary push buttons also located in the pumphouse.

Air Powered Hoists Handle Pipe

Tube-Kote Inc., Houston, Texas, Plasticoats Tubing for Chemical Industry





THE COLLECTION REQUIRED TO SATIS-FY PUBLIC NUISANCE COMPLAINTS FROM NEIGHBORS IN A PLANT AREA IS ILLUSTRATED BY THIS LIMESTONE DRYER PROBLEM. IT EMPHASIZES THE IMPORTANCE OF VERY HIGH DEGREE OF SOLIDS REMOVAL WHEN HEAVY CONCENTRATIONS ARE INVOLVED. PRI-MARY COLLECTION, EVEN WITH 90 PER CENT REMOVAL WILL NOT ALTER DISCHARGE APPEARANCE OR NEIGH-BORHOOD COMPLAINTS. THE ADDI-TION OF THE WET COLLECTOR TO RE-MOVE PRACTICALLY ALL OF THE SOLIDS PROVED THE NEEDED ANSWER.

High Temperature Gas Cleaning

Wet collection methods will solve a large portion of high temperature stack gas cleaning problems. Collection efficiency is high on particles in the small micron size, and the high temperature and/ or moisture-laden gases can be readily handled.

sance control has focused atten- gases containing considerable

THE nation-wide emphasis on tion especially on those applica-air pollution and public nuitions where hot, and often moist,

Dust Control Division American Air Filter Company, anc. Louisville, Kentucky

> quantities of solids are discharged to the atmosphere. As a group such processes have not been provided with effective collection equipment because of the difficulty and expense involved.

By John Kane

Chief Engineer

Small Particle Size

Particle size of solids in stack gases, particularly from kilns, furnaces, roasters and like equipment where melting or chemical reaction like calcining takes place, is very small with high percentages



DUST LOADINGS ESCAPING THE PRI-MARY DRY TYPE CENTRIFUGAL COL-LECTOR IN THIS ASPHALT PLANT WILL RANGE FROM 3 TO 10 GRAINS/ CU FT. REMOVAL OF 97 PER CENT OF WET COLLECTION EQUIPMENT. THESE ESCAPING FINES CAN BE OB-TAINED WITH WET

*Abstract of an address presented by Mr. Kane before the A.S.M.E. Process In dustries Division Pittsburgh Regional Con

of the material by weight in the low micron or sub-micron range. In rotating kilns or dryers, the stack gases flowing through the cascading material air convey high concentrations of fine solid particles from the process and up the discharge stacks.

Types of Equipment

When collection equipment is considered, the dry type centrifugal will seldom be selected except as a primary separator to remove the bulk of a heavy loading in a gas stream. Efficiency of collectors in this group is not good on low micron dust particles and their installation will seldom improve an air pollution problem for application in the group under discussion.

The removal of flyash from pulverized fuel and spreader type stoker fired boiler stack gases is an exception to this statement. Dry type centrifugal collectors for this problem have been accepted for such stack gas cleaning problems except for plants of large volume emission rates like central stations located in built-up municipal areas.

Fabric-type arresters will have little application to cleaning problems of this type as temperatures encountered are too high or moisture content introduces condensation and plugging difficulties.

By the elimination process, the other basic types of equipment left for consideration are the high voltage electric precipitator and the wet type dust collector designs. While the electric precipitator gives excellent results on most applications in this group and has been used extensively where large gas volumes are involved, its high cost makes it unsuited to many smaller volume applications if less expensive equipment can give a reasonable degree of collection.

Wet Collection Solves Many Problems

Wet collection methods have proved to be the answer to many of the stack gas cleaning problems in this group. Collection efficiency is high on particles in the small micron size, and the high temperature and/or moistureladen gases can be handled without difficulty.

Shortcomings could be listed as troubles from corrosion where acid forming gases or materials are involved and the reduced collection efficiency on sub-micron particles encountered in metal fume collection problems and similar applications.

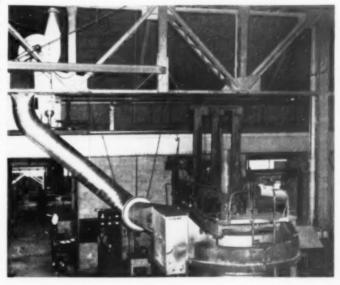
With some of the more recent introductions in wet collector design, further reduction in solids escapement is possible from operations like the zinc oxides from brass furnaces, and the lead oxides from battery smelting, etc.

The present-day emphasis on air pollution and public nuisance control has focused attention of regulating agencies, owners, and collection equipment manufacturers on these problems of high temperature stack gas cleaning. Data is being assembled defining the loadings and particle size of the contaminants and the stack gas composition.

Present-day collection equipment will solve a large portion of the problems in this group while new or improved equipment designs for the remaining problems are sure to come in the near future as the cleaning requirements are clarified and the need for such designs become increasingly evident.

These are before-and-after views of an electric melting furnace taken while the furnace was in operation. Over 90 per cent of particles released in this operation are oxides of iron and sill-ca with particle size in the order of 0.5 microns. Good conventional wet dust collectors can remove some 80 per cent of such particles and reduce stack concentrations from about 1.0 grain/cu ft to concentrations in the order of 0.2 grain.





A Guide to Turbine Maintenance

-PART I-

Robert H. Emerick

Consulting Mechanical Engineer North Charleston, S. C.



Photos Courtesy General Electric Co.

FIG. 1. THRUST AND SLEEVE BEARINGS OPEN FOR INSPECTION.

THE AUTHOR does not hope to teach all the intricate procedures of steam turbine maintenance "in two easy lessons". He does hope however that the brief summary of his wide experience presented in this and the following installment will warn the less experienced maintenance man against biting off more than he can chew, and give the experienced mechanic direct help in undertaking modest turbine repair jobs. It is also believed that some understanding of maintenance problems and procedures constitutes a real contribution to better operation. This brief introduction would be incomplete without also emphasizing that there is no real substitute for the services of trained factory service men on important jobs. Extensive repairs to large expensive units should never be undertaken without the help of an experienced supervisor.—The Editors.

BEARING temperatures are important indicators of operating conditions and therefore should be checked frequently during every watch. Doing this is a simple, preventive maintenance measure. The oil itself, going to these bearings, should have its cleanliness verified at least once daily.

Any bearing that runs more than 10 degrees hotter than its mates should be regarded with mistrust and apprehension. During initial operation of a new bearing, temperatures should be checked every minute, and if the temperature rise is faster than 1 degree per minute, the presence of grit on the bearing surface (or trouble elsewhere) is indicated. In these cases, a prompt shutdown and inspection are in order.

Too much confidence should not be placed in a bearing's wearing in properly, Journals cannot stand much bumping around without getting out of round themselves, so to be safe, bearings should be scraped in only by a man who is careful and conscientious in his work. A sloppy job is its own prophet of future trouble,

In renewing bearings, dimensions and oil grooving arrangements should not be changed without the approval of the turbine manufacturer. No matter what our own ideas are (and we all have pet ideas on how a bearing should be grooved) trying them out can be dangerous. Every groove reduces the bearing surface area, and thereby increases the unit stress. Quick failure can follow an impulsive and rash change.

Corrosion found in bearings is generally the result of high temperatures and improper oil. Some types of bearings are made up of alloys particularly susceptible to acids, and a touch of acid in the oil can ruin the surface of such bearings in jig time.

Every engineer has found at times a condition of alligatoring or spalling in his bearings. In such cases, first eliminate the possibility of a defective bearing, then evaluate the oil supply with respect to interruptions or starvation. Overloading and overspeeding become our next items for investigation. Finally, all other explanations failing, some thought is in order concerning the bearing material itself, because there is a possibility of the metal's having an unsuitable analysis for the loads and speeds involved. The analysis is particularly critical in thin shell, high speed bearings.

As an example of the analysis factor, a set of bearings investigated by the writer which habitually failed between 600 and 800 hours of operation, performed perfectly after the manufacturer had changed his bearing material for that particular installation to provide a slightly higher content of lead.

Oil starvation can occur as the result of dirty or fouled oil passages within the turbine itself. For instance, a turbine generator subject to periodic wiping, was discovered to be suffering from the effects of a sloppily drilled oil passage in the pedestal. Cuttings from the original boring operation partially blocked the passage, and less than half of the oil intended for that bearing ever reached it.

Speed has a great influence on bearing life, and if we set up our governors a couple of hundred rpm, we should resign ourselves to shorter bearing life.

Engineers interested in a comprehensive discussion of bearings should obtain a copy of the "Handbook of Sleeve Bearings" written by Albert B. Willi, and published by the Federal-Mogul Corporation of Detroit, Michigan.

Figure 1 illustrates a thrust bearing and sleeve bearing frequently seen in everyday practice.

Packing

To move our maintenance considerations from the bearings to the packing of a turbine is not a long journey. Figure 2 shows a type of metal packing that is performing successfully its assigned

duty of keeping steam within the turbine and the air outside. These thin blades of soft metal are accurately located. If we misalign a turbine rotor in the bearings we can expect to damage packing strips such as these. They will bend over, break off, or wear off at the apex. They have been known to jam up and score the shaft, and to prevent a scored shaft from passing steam or air is a trick not easily accomplished. Preserving the packing is far easier.

As everybody likes to save money, we can sometimes do so by reclaiming damaged packing. We make up a couple of swages as illustrated in Figure 3, ground to suit the correct slope of the metal, and use them to work the packing back to its original shape.

Carbon packing sometimes damages the shaft if a spring breaks, or the carbon is too hard or contains impurities. New carbon rings must be fitted with care, and cheap carbon for this purpose can be

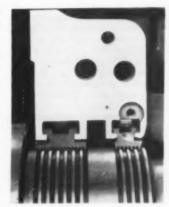


FIG. 2. CLOSE-UP VIEW OF METALLIC PACKING.

the most expensive single item ever bought. A poor and abrasive carbon can turn a smooth and polished shaft into a piece of scarred steel faster than we can talk about it

Anytime we see a wisp of steam steadily growing larger as it emerges from a gland, we should heed the warning and inspect the packing at the earliest possible moment. The sooner the safer,

Shafts

There are several ways of repairing scored and deeply scratched shafts. Considerable work is being done with metal sprays and while the results are not inevitably perfect, successful jobs are numerous enough to justify a try.

Figure 4 shows a journal prepared for metal spraying. This journal has been pounded out of round and the surface shows some scores. Preparation for spraying consists of putting the shaft in a

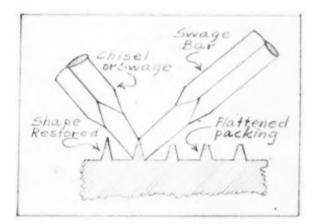
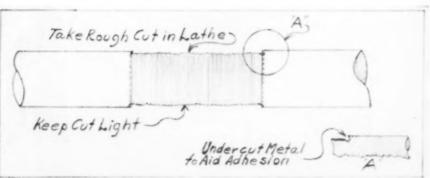


FIG. 3. SALVAGING DAMAGED PACKING.

FIG. 4. SURFACE PREPARATION FOR METAL SPRAYING.



lathe and then taking a series of shallow, rough cuts, using a round nosed tool to procure some width at the bottom of the cuts. Obtaining a slight overhang at the top of the "threads" is desirable, since the sprayed metal is held in place strictly by mechanical adhesion.

One advantage of metal spray-

ing is that a coating or corrosionresistant metal can be applied to an otherwise susceptible surface. The gun being portable offers another advantage. In operation, wire usually about 's" thick is fed automatically into the gun and into the oxy-acetylene flame which melts it. The molten metal is then projected from the gun nozzle by compressed air in the form of a spray which is deposited on the surface being repaired. Air pressure of 60 psig is often thought adequate, but this writer advises 80 psig at least and 100 psig is even better.

After the spraying is completed, the shaft is returned to the lathe. turned down to size, ground and polished. Occasionally the new surface will alligator or spall during the finishing operation. If this happens, the adhesion has been poor, but the reason for the poor adhesion is often a mystery. However it will be noted that rainy or humid weather at the time of spraying seems to affect the adhesion adversely. Probably minute particles of moisture or dampness deposited by the humid atmosphere on the prepared shaft, are trapped by the congealing spray and thus produce voids in the physical bond. Of course dryness in the compressed air is essential.

An alternate way of treating a scored shaft is to turn it down undersize and then make new bearings to fit the smaller journal. Occasionally shaft sleeves have been used, keyed, dowelled or shrunk in place. Generally however, it is better and cheaper to buy a new shaft rather than to attempt repairs that are beyond the spray or turn-down treatment.

Lifting Casing

Moving into the turbine, our

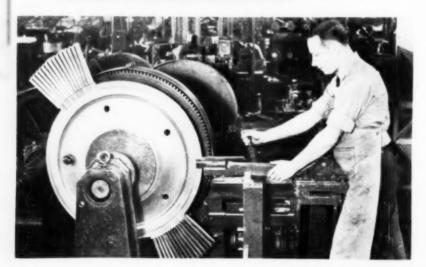


FIG. 5.
RIVETING
SHROUDING
IN
POSITION.

FIG. 6. HOW THE FACTORY INSTALLS TURBINE BLADES. first problem is to properly lift the turbine casing. Handling a casing requires exacting care, for unequal lifting strains may change the shape of the contacting surfaces and seriously deteriorate the tightness of the joint. This seems incredible, considering the traditional stiffness of iron and steel, but actually the writer has observed cast iron cylinder heads 36" in diameter weaving and breathing like thin plate diaphragms. In the case of turbine joints, where a thousandth of an inch is critical, tightness is affected by distortions too small for us to see. Just look at those through bolts which are required to hold the joint together-they are not placed so close to each other for the sake of beauty, but to combat tiny local irregularities in the contacting surfaces.

Suppose we have lifted the casing because a rumbling, bumping or knocking has developed in the normal sounds of operation. These sounds may be the symptoms of water, or some foreign material in the turbine, or a warped rotor, If we discover the last, we may feel a little guilty, remembering that we neglected to jack over the turbine during a recent shut-down. This jacking should be done at least once a day and for 114 turns, a number that keeps us from stopping exactly where the jacking started. Alternatively, we might have brought the turbine up to speed without first seeing that temperatures were developing uniformly. Or perhaps in a hurry to go home, we may have simply closed the throttle and walked off.

Warped Rotor

Occasionally a warped rotor (especially one that has warped from neglect of jacking), can be straightened up in this way: Admit a sharp puff of steam into the turbine, then close the throttle and start jacking. Do this for several hours, allowing the steam to condense during the jacking. The job is tiresome, but may save time and labor in the long run.

Attempts have been made to correct a warped shaft by the judicious use of a torch—a rather ticklish bit of work and not normally recommended. As a last re-

sort of course, we can pull it out, set it up in a lathe and then heat it locally with care.

When a turbine develops a case of the shivers, there is nothing to do but shut it down. Occasionally this vibration is a temporary ailment resulting from uneven heating at the moment of starting up. The procedure then is to wait a few minutes for the heat to soak through the metal, followed by a careful opening of the throttle. If the vibration continues the probabilities are we shall need to look inside.

Broken and lost blades will throw the rotor out of balance and are a rather common cause of vibration. A binding in the bearings, or a too tight fit of the packing, both metallic and carbon can produce similar symptoms. And of course there is the condition of the warped rotor.

Installing Blades

We know what to do about the bearings, the packing and warped rotor, but installing new blades is a job for an artist. Figure 6 shows how it is done by the builder. We are not likely to be so admirably tooled, so our course is one requiring human skill. Machining out the old blades is desirable, to clear the way. Then to install new ones, we should first file smooth and clean up the dovetail in the wheel. After the first blade has been fitted and we are satisfied it can be driven smoothly into place, we should use it to gage the sizes of succeeding blades. Proper sizing before any attempt is made to drive the blades into the dovetail. can save us considerable sweat, not to mention the benefit to the dove-

To aid the movement of the blades, we can paint the groove with a little castor oil, or prepare a thin lubricant of white lead and machine oil. Actual driving in all cases should be accomplished through a brass drift, and two or three blades should be driven as a unit. The unsupported end of the blade should be held firmly in the hand, as the vibration of the driving may otherwise fatigue or even crack the blade during the operation.

When the time comes to install

the shroud, we should remember that the shroud is designed to fit the blades and the blades are not designed to fit the shroud. This means that the tenon holes in the shroud should be made from a template, this template representing the position of the blades after we have finished with the driving. Prudently, we shall never keep prepared shrouding in stock; the sight of that neatly punched or drilled strip in the store-room could be too much temptation for our moral resistance, and we would likely force the blade tenons into it whether they protested or not. Figure 5 shows a shroud band going into place.

Clearances

After the rotor is re-bladed, balanced and set back in the bearings, we must check and record all clearances. The correct clearances may be obtained from the turbine builder if they are not already on hand.

Taking axial clearances is easy, but the radial figures are not so easily obtained. We start the procedure by painting the top, bottom and sides of the rotor with hot paraffin, then accord similar attention to the inside of the casing in each stage.

We next replace the casing and bolt it together just as though the job were finished, except that we can skip every other bolt or two. Inside the casing, we now have paraffin against paraffin, so we jack over the rotor 14 turn. Up comes the casing again, and with a thin sharp knife we lift off the paraffin and measure its thickness with a micrometer. The answer is our approximate clearance. The actual clearance can be obtained by either adding or subtracting the thickness of the oil film in the bearings, if any, which obviously affects the centering of the rotor. Side tip clearances are likely to be a little greater with the casing down than with the turbine open, because the casing tends to spread slightly when bolted home.

With some turbines the tip clearance design is less critical than with others; each turbine must be sized up according to its characteristics.

How to Maintain INDUSTRIAL CONTROLS

PART 3 - TROUBLE SHOOTING



Part 1 of this 3-article series, Inspection Schedules, appeared in the May issue. Part 2, Tools and Procedures, was presented in June. This final, Part 3, installment discusses Trouble Shooting.

By W. P. Patrick

Control Division General Electric Co. Schenectady, N. Y.

WHEN a failure of industrial control equipment occurs the maintenance man usually has to operate under very heavy pressure in the interest of keeping the down-time to a minimum. Therefore, it is important that he be thoroughly familiar with the equipment and understand its operation. A copy of the manufacturer's elementary diagram and, if available, a copy of the Instruction Book should be kept handy for reference purposes. Portable instruments, capable of reading current voltage and resistance, are valuable tools which can aid materially in isolating the trouble.

Should it be necessary to replace some parts which have been permanently damaged, then it is important to give the manufacturer the complete data taken from the nameplate of the device involved. This data should include device type, form designation and catalog number, and model or serial numbers. In cases where a renewal parts bulletin is not available to help identify the parts by a catalog number, then, the safest thing to do is to return the damaged parts to the manufacturer. In this way, you have assurance that the new part when received will be the right one for the job.

Chronic Failures

Report to the manufacturer any failures that become chronic. In many instances it is most helpful in analyzing the cause of the failure to have the damaged part available for inspection. Therefore, where practical, return it to the manufacturer with a report describing the failure and your opinion as to why the failure occurred, including any suggestions you may have for preventing its recurrence.

Your report should include as much as possible of the following:

Complete nameplate data on controller.

- Nameplate data, and function of equipment on which the controller is used.
- Manufacturer's requisition or order number, if available.
- Duty cycle and details of operation.
- Length of time equipment has been in service, and estimated total number of operations.
- Voltage and frequency conditions at the panel, and other pertinent electrical data.
- Complete description of manner in which failure occurred.
- Complete information on any unusual service conditions.

Trouble Shooting Chart

As an aid in trouble shooting, a trouble shooting chart follows. As in previous installments the chart here again is for convenience subdivided into two sections, namely, Table 1—Industrial Manual and Magnetic Control, and Table 2—Industrial Electronic Control.

Table 1—Trouble Shooting Chart Industrial Manual and Magnetic Control

Trouble	Cause	Remedy
CONTACTS		
CONTACT	Poor contact in control pick- up circuit.	Improve the contact or use holding interlock,
	Excessive jogging.	Find out whether device is recommended for joggin service. If it is not, caution operator,
	Broken pole shader.	Replace.
	Contactor slams, thus open- ing interlock in coil circuit.	Increase wipe, also pressure on interlock.
OVERHEATING OF	Copper oxide on contacts.	Install silver-faced contacts. If copper contacts—fit with a fine file. (Caution: excess filing wears out the contacts.)
	Carrying load continuously for a long time.	Install silver-faced contacts.
	High inductive loads, such as d-c fields.	Install silver-faced contacts.
CONTACTS	Sustained overload.	Reduce current or install a larger device.
	Insufficient contact pressure.	Clean, adjust.
	Loose connection.	Clean and tighten. (Measurement of the millivolt dro across the current-carrying connections will indicate where excessive heating originated.)
SHORT-CIRCUIT ON CONTACTS	Feeder fuses too large.	Eliminate short circuits and use smaller fuses i feeder.
	Interrupting high currents. (Note: Contact life varies approximately inversely as the square of the current interrupted, Therefore, Jogging may wear contacts more than 30 times as fast as an equal number of straight starts, with stops from full speed.)	Install special contacts designed to withstand arcin better than copper. There are cases where these can not be used because of their high resistance and lower ating.) Install larger device designed for joggin service.
CONTACT	Excessive filing or dressing.	Never file silver contacts. The rough spots will no hurt them.
LIFE	Oil-immersed device is a misapplication. (Note: Oil-immersed contacts burn away from 20 to 40 times as fast as similar contacts breaking the same current in air.)	Change to air-break device if oil is not essential.
	Mechanical rebound on drop- out, causing contacts to re- make.	Reduce rebound, or report trouble to manufacturer.
	Wear allowance gone.	Replace and adjust.
WEAK CONTACT PRESSURE	Poor contact adjustment.	Adjust gap and "wipe."
FREGORE	Low voltage which prevents magnet sealing.	Correct voltage condition (possibly line regulation),
WELDING OR FREEZING OF CONTACTS	Abnormal inrush of currents of more or less than 10 times continuous rating. (This will vary, depending on the type of device.)	Reduce currents. Substitute special nonweld contact Install larger device. Install copper contacts, (Cautior overheating of copper contacts should be considered
	Rapid jogging.	Install copper contacts if otherwise suitable.
coils		
COIL FAILURE OPEN CIRCUIT NOT ROASTED	Moisture, corrosive Atmos. Mechanical damage. Excess vibration or shock; coil movement causing insu- lation fallure or broken wire.	Protect coils or use special resistant finish. Do not handle coils by the leads. Relocate and provide a special mounting, coils should be held firmly in place. MORE-

Trouble	Cause	Remedy
OVERHEATED ROASTED	Overvoltage or high ambient.	Check application and circuit.
	Wrong coil, short-time-rated coil energized too long.	Check manufacturer.
	Shorted turns, caused by mechanical damage, corro- sion, or conducting dust.	Replace coil and correct conditions if practical to do so
	Too-frequent operation (very rapid jogging or a-c coils).	Check application.
	Undervoltage, failure of magnet to seal in.	Check circuit interlock.
OVERHEATED	Used above current rating.	Install larger coil, or reduce current.
	High amblent.	Relocate, or regulate temperature.
	Loose connection, corrosion, oxidation on connection surfaces.	If connection is hot, clean before tightening.
	Improper installation.	See manufacturer's instructions.
FLEXIBLE SHUNT FAILURE	Large number of operations —worn out mechanically.	Replace shunt.
	Corrosive atmosphere or moisture.	Incorrect application.
	Burned by arcing; oxidized connection.	Check application and system voltage.
MAGNETS AND O	THER MECHANICAL PARTS	
WORN OR BROKEN PARTS	Heavy slamming caused by: over-voltage, underload, wrong coll. Chattering caused by: broken pole shad- er or poor contact in control circuit. Heavy-duty cycle. Too much jogging. Abrasive dusts, mechanical abuse.	Replace part and correct cause of damage. Note: The expected mechanical life should be measured in number of operations.
	Broken pole shader, magnet faces not true — result of wear or mounting strains.	Replace. (For locations where a very slight hum is ob- jectionable, use d-c magnets. Hum can be reduced by mounting on rubber or springs to eliminate sounding- board effect.)
NOISY MAGNETS	Dirt or rust on magnet faces.	Clean.
	Low voltage.	Check system voltage.
	Improper adjustment—mag- net overloaded.	Check manufacturer's instruction sheet.
BROKEN POLE SHADER	Heavy slamming caused by: over-voltage, magnet under- loaded, weak contact pres- sure, wrong coil.	Replace and correct the cause.
SLIDING CONTACT	S-Drum Switches, Rheostats, I	Cnife Switches, etc.
OVERHEATING	Overcurrent; weak contact pressure; oxidation; high ambient; rough contacts.	For very heavy service, use special alloy contacts. Lubricate periodically as manufacturer recommends.
ABRASION, ROUGHENING OF CONTACTS	Lack of maintenance and lu- brication; very heavy serv- ice; arcing; oxidation; abra- sive dirt.	Sliding contacts usually require lubrication, (Use lubricant recommended by manufacturer.) Special alloy contacts should be specified for extra-heavy service.
ARC CHUTES PITTED, WORN OR BROKEN	Abnormal interrupting duty (inductive loads), excess vibration or shock.	Check application. Note: On severe-duty applications, are chutes wear out and must be replaced periodically.
	Moisture.	Eliminate pressure of moisture or keep several chutes on hand for replacement.
	Improper assembly.	See manufacturer's instruction sheet.
	Rough handling.	
INSULATION	Overvoltage, voltage transients, high induced voltages.	Correct system voltage. Use discharge resistors where needed, $% \left(1\right) =\left(1\right) \left(1\right$
FAILURE	Mechanical damage.	Replace damaged parts.
	Moisture, dirt and fumes, overheating (carbonizing),	Keep controls clean and dry. Get special coil for application.



FOR

CONDENSATE CONTROL IN HIGH PRESSURE POWER PLANT INSTALLATIONS WHERE VALVE HANDLES FLASHING CONDENSATE BETWEEN HEATER STAGES

Popular Sweep-Flo angle body with designed contours to avoid abrupt changes in flow direction. Embodies use of venturi throat recovery nozzle which offers two outstanding advantages.

- 1. Reduction of noise as encountered in condensate flashingreducing cavitation with its high level noise nuisance. Recovery throat allows gradual reduction of velocity as sectional area increases to full diameter in venturi throat fashion.
- 2. Enables flash conditions to take place downstream from valve-or in heater-or in evaporator. Eliminates washing out of valve, fittings and line, as is quite regularly encountered where condensate handled has low oxygen concentration.

WRITE TODAY FOR FURTHER DETAILS

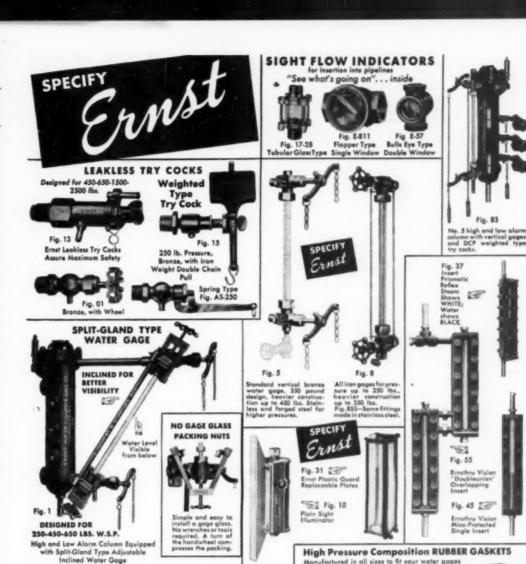
VENTURI THROAT RECOVERY NOZZLE Sectional View of

Throat extension acts as retainer for valve seat ring. Welded in place to prevent loosening under vibrating conditions.

FISHER GOVERNOR CO., Marshalltown, Iowa

Table 2—Trouble Shooting Chart Industrial Electronic Control

Trouble	Cause	Remedy
	Defect in circuit components such as: Broken or loose connections. Shorted or open capacitor. Open resistors or potentioneters. Shorted or open transformer winding. Shorted or open relay coil. Shorted or open contactor coil.	Check circuits functionally. Repair or replace defective component. If circuit voltages have been included with instructions, check these as a means of locating the trouble. Otherwise, make a visual inspection of the panel for defective parts, and check values of components with suitable testing equipment. Particula attention should be given to electrolytic capacitors since this type of capacitor has a limited life, and fail ure may occur after several years of operation. When replacing, be sure to observe polarity.
SYSTEM	Defective tubes.	Test tubes and replace those found deficient.
INOPERATIVE	Tubes placed in wrong sockets.	Check tube locations with socket markings or circui diagram. Correct discrepancies.
	System out of adjustment.	Check and adjust in accordance with manufaturer' instructions.
	Fuses blown.	Check all fuses. If found blown isolate trouble befor replacing. Never use fuses larger than those recommended by manufacturer.
	Faulty contactors or relays.	Check all contactor and relay contacts for welding poor contact, open or burned out operating coil. Repai or replace those found defective.
	Timing relay for gas filled tubes may be malfunctioning.	Check its operation to be sure it is functioning proper ly and if not repair, adjust or replace.
CONNECTION OR LEADS BREAKING	Excessive vibration.	Install extra flexible connections.
REDUCED TUBE LIFE OR TUBE FAILURE	Vibration or mechanical abuse.	Shock mount control panel and use extra flexible leads. Prevent objects from striking tube, tube holder o socket. Element may be jarred out of position or welded connections broken.
	Faulty associated capacitors or resistors.	Check all capacitors and resistors in defective tub circuit. Replace those found defective.
	Natural deterioration. Usually failure is due to gradual loss of electron emis- sion as the active cathode material is used up or flakes off.	Be sure deterioration is at a rate consistent with expected life for each type of tube in its particular service. If the tube life seems too short, see following recommendations.
	Incorrect voltage on filament or heater.	Check voltage at tube terminals frequently to deter mine nature of error. Do this with tube in socket both with and without anode load connected.
	If voltage is: Fluctuating (more than plus or minus 5 per cent from rating).	Install voltage regulating transformer.
	Consistently high or con- sistently low.	Adjust taps (if any) on transformer, or install new heater transformer, or install auto or booster trans- former to correct volage.
	If voltage is: Erratic—on and off.	Check wiring from heater supply to tube sockets for loose connection or break.
	Ambient temperature too low or too high.	Provide extra heat or forced air cooling to hold tem perature within limits specified in tube instructions Ambient temperature should be measured at the tube Consult tube instruction sheet before applying cooling means.
	Excessive loading. Operators may have increased anode voltage, replaced coils, or made other changes to obtain greater output.	Tube should not be operated at outputs greater that those for which it has been designed. MORE-



GAGE GLASSES-Tubular and Flat Type





Specify: B-Inside Diameter A-Outside

C-Thickness

Diameter Fig. 21-Lip Mold Fig. 22-Standard

Rubber Gasket

ERNST WATER COLUMN & GAGE CO. Mein Office and Works: 250 South Livingston Avenue

CONSULT YOUR LOCAL ERNST REPRESENTATIVE

CONSULT YOUR LOCAL ERNST REPRESENT.

CONSULT YOUR LOCAL ERNST REPRESENT.

Tel. Hubbard 2-8352
BUFFALO: B. M. Cocasy, 505 Crosby Bidg.,
Tel. Circuland 1638
Go., 7309 East End Ave.,
MILWAUKEE: Seam Plant Equipment Co.,
4433 W. North Ave., Tel. Kilbourn 8210
MINNEAPOLIS: Alser C. Price Co.,
257 Fourth Ave. South, Tel. Main 3551-3552
NEMSINEAPOLIS: Alser C. Price Co.,
143 Broadway, Tel. Main 2551-3552
NEWJARK, N. J.: MacDonald Sales & Eng. Co.,
143 Broadway, Tel. Humboldt 2-1559
NEW LONDON, CONN. J. H. Leatherbee,
243 Ledyard Sc., Tel. New London 2-1456
NEW YORK: Stanley Sales Co., 1440 Broadway,
Tel. Penna. 6-0277, Longacre 5-6743

OKLAHOMA CITY: Federal Supply Co., 120 East Main St., Tel. 3-7:01
PHILADELPHIA: Wm. A. Krebs.
1443 Land Tide Bldg. Tel. Locust 3023
RICHMOND: Russell R. MacDonald Co., 603 Atlantic Life Bldg. Tel. Locust 3024
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY: C. H. Spenier & Co., 1245
SALT LAKE CITY LAKE CIT

Trouble	Cause	Remedy	
REDUCED TUBE LIFE OR TUBE FAILURE	Too frequent operation.	When equipment is used intermittently, tube life may be increased by leaving cathodes heated during un- loaded periods. This prevents strains caused by too frequent heating and cooling.	
MERCURY-VAPOR TUBES DON'T "FIRE"	Ambient temperature too low.	Measure air temperature next to tube; provide hea to bring temperature up to value specified in tube in structions. Manually or thermostatically controlle strip heaters are recommended.	
ARC-BACKS AFTER TUBES HAVE WARMED UP	Ambient temperature too high.	Provide forced-air cooling according to instruction sheet on tubes. (Mercury-vapor tubes are rated on the basis of "condensed mercury temperature.")	
ARC-BACKS WHEN TUBE IS FIRST PLACED IN SERVICE	Mercury vapor splashed on elements during shipment or handling of tube. Tube not kept in upright position.	Heat the tube cathode to distill this mercury before anode power is applied. Make sure cathode is heater for the length of time stipulated in instructions furnished with tube.	
	Interlocks or protective con- trol devices not operating properly.	Check contacts to see that they close and that they are clean.	
FAILURE OF TUBES TO OPERATE WHEN STARTING EQUIPMENT	Cathode protective timer has not completed its timing cycle.	Wait until timing cycle is completed before attempting to operate equipment.	
	No voltage at control panel terminals.	Check external connections to be sure they are correct Check fuses. Check panel connections to be sure they are right.	
	Incorrect power.	Check the terminal voltage to make sure it corre sponds with nameplate rating.	
	Missing connection.	Recheck the circuit with wiring diagram.	
	Tubes will not heat up.	Check with wiring diagram to make sure tubes are in the right places. The thyratron tube will be warn when cathode is heated. Do not touch metal power tubes while power is on the panel.	
	Tubes may have been damaged internally through shipment.	Replace tube.	
OVERHEATED	Overload.	Check cause of overload and remove.	
TRANSFORMER OR REACTOR	Defective unit.	Warning is usually given by the odor of excessive heating, melting of the sealing compound, smoking of charring of the insulating paper. Replace transformer	
OF CONTACTS OR RELAY	See manual and magnetic control section.	See manual and magnetic control section.	
	No light on phototube, or light reduced below that required for operation.	Check light source. Replace lamp, if burned out.	
LIGHT SOURCES USED WITH PHOTO- ELECTRIC CONTROL	Light source, phototube hold- er aperture, or surface from which light is reflected may be out of alignment.	Alight correctly and check mounting supports for evidence of vibration.	
	Dirt on surfaces through which light passes or from which it is reflected.	Clean the surfaces and inspect at regular intervals.	
	Line voltage not within the limits specified.	Correct line voltage.	

Additional copies of this excellent 3-article series on "How to Maintain Industrial Controls" will be made available to plant engineering personnel. Write The Editors, Southern Power and Industry, 806 Peachtree St., N. E., Atlanta, Georgia.



There are 9 reasons—the 9 Yarway Impulse Steam Traps draining the 8-roll Hoffman installation in the all-Yarway-equipped laundry at Temple University Hospital, Philadelphia. The other Yarways are on tumblers, presses, water heater, etc.

In laundries and cleaning plants—as in all plants using steam equipment—profitable operation depends on equipment getting hot quickly, and keeping continuously at peak temperature for the full operating period.

Yarways do this by opening wide during heating-up period to discharge air and condensate fast. Then, when peak temperature is reached, the trap discharges heat-retarding condensate as it forms instead of waiting for quantities to accumulate. Result-maximum temperature... maximum operating profits!

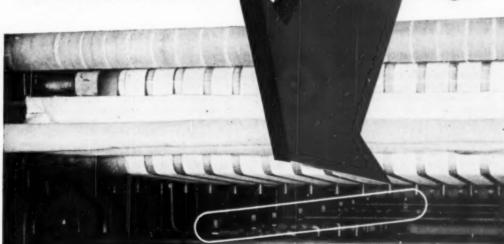
Other Yarway features—only one moving part (a little valve), low maintenance, easy installation, low cost. More than 650,000 have already been installed.

Yarways are sold by more than 200 distributors in the United States and other countries.

Install a Yarway on free trial in your plant. See your nearest distributor, or write to . . .

YARNALL-WARING COMPANY

Home Office: 116 Marmaid Ave., Philadelphia 18, Pa. Southern Rep.: ROGER A. MARTIN, Sona Allen Building, Atlanta 3, Ga.



Stainless Steel Body

YAR WAY

IMPULSE STEAM TRAP

SPENDTHRIFT ROAD TO SOCIALISM

No. 3 in a series of editorial messages

EVERY time the sun sets your federal government is \$15,000,000 deeper in debt. How long can this last?

This is the disturbing reminder appearing on a number of billboards erected by the chambers of commerce of Anniston and Gadsden, Alabama. It is a message which might well be displayed on every highway in the nation, printed in every newspaper, and repeated on every broadcasting station. For until the people generally become aware that the road we are now following leads not only to national bankruptcy but to the loss of our individual liberties.

it will be difficult to curb our present wild orgy of federal spend-

Not many years ago the first "billion dollar Congress" aroused widespread criticism. Yet, our federal government today is spending at the rate of a billion dollars every nine days!

During these days of peak prosperity, with

tax collectors taking nearly 30 per cent of the total national income, our federal government still operates in the red. Present estimates are that the federal debt will be increased nearly seven billion dollars this fiscal year.

That federal debt, today, has passed the astronomical figure of a quarter-trillion dollars. The figure is meaningless unless we apply some measuring stick—such as the fact that this debt is nearly twice the assessed value of all the nation's farms, homes, factories, business buildings and other capital assets.

More disturbing than the size of the debt is the failure of government to do anything about it.

From the first world war the United States emerged with a debt of more than \$26 billion, which then seemed a back-breaking burden. But as the result of sound fiscal policies the debt was cut almost in half by the end of 1930.

In striking contrast, we are today adding to the

federal debt substantially, even during years of great prosperity and maximum tax returns.

Admittedly, there may be little prospect of important savings in the war-connected expenditures which make up the greater part of the proposed \$42 billion budget for the fiscal year 1951. But in that same budget the proposed expenditures for domestic programs—such as housing subsidies, public works, social welfare, agricultural subsidies, etc.—were set at more than \$11 billion. And that's almost double the 1948 outlay for those same programs.

The federal government today has more than 2,000,000 civilian employees — nearly twice the pre-war total —whose combined payroll exceeds \$6 billion. Surely here is opportunity for savings.

But instead of economizing on other expenditures in order to finance such an emergency as the "cold" war, our economic planners propose more

heavy raids on the federal treasury. One is socialized housing. Another is socialized medicine. Still another is the Brannan plan. Ultimate cost of each would be many billions of dollars.

"If we do not reduce these federal expenditures, the alternative is more taxes or deficits, more government competition, and more regimentation," says Senator Harry F. Byrd. "The fact is that deficit financing in time of peace is piling up a federal debt to proportions in which the liberties of free enterprise cannot survive. . . . Neither a democratic form of government nor a free enterprise system can exist in national insolvency."

Meantime, what can we individually do about it? We can express our views to the members of Congress. We can urge that non-essential expenditures be eliminated and the budget balanced. We can help keep local interests from seeking federal appropriations. We can create wide-spread support for a rigid program of economy.





Ask for a demonstration.

Chicago, Cleveland, Detroit, Pittsburgh. Distributors: All Principal Cities



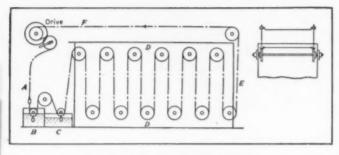


Unsurpassed for cutting off sprues, gates and risers from non-ferrous. stainless steel, monel and cast iron castings . . . slotting track welds . . cutting transite, fire brick, etc.

Top Performance Consistently Duplicated



Readers are invited to send in kinks, ideas, and suggestions. Payment is made for all material accepted.



Chains Prefer Lubricants

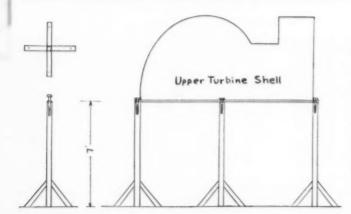
NE operation in a Southern fabricating plant is the lacquering of small stamped steel transformer boxes. Before applying the lacquer, it is necessary to thoroughly degrease the parts.

The layout of the machine for cleansing, lacquering, and drying in one continuing operation is shown in the illustration. Operators hook the parts to spacer rods between two strands of pintle chain at A. They pass slowly at B into a heavy degreasing gas remotely related to mustard gas, which is so heavy it rests in the tank like an invisible liquid. They emerge completely degreased (as also are the chains), to dip into the lacquer bath C, then over and under a series of guide sprockets within the drying chamber D, and are removed at E. The chain speed is 10 fpm.

When the machine was put into service it was found that the power input was 3 hp against an estimated 1 hp. Then it was observed that the 1 3/16 in, sprocket shafts toward the far end of the drying chamber were deflecting. The pull on each chain at B could hardly exceed 100 lb, but evidently, as deduced from the power input, this built up to about 4000 lb per chain due to friction in the rigid sprocket bearings, friction in the degreased chain links articulating around 30 sprockets and binding in the bearings under the deflecting tension.

The shafts between D and E were provided with self-aligning bearings which dropped the power input to slightly over 1 hp, or a pull at F of about 1500 lb per chain, still showing considerable build-up between B and F, and demonstrating the well known fact that power loss results when a chain under load is articulated without lubricant.

WILBUR G. HUDSON



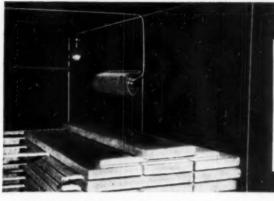
Turbine Shell Supports

To assist in positioning, and for added safety while cleaning turbine shells, we made a number of supports (see drawing) that can be bolted through the shell bolt holes to support the turbine shell in the best position for cleaning. The traveling crane will still remain attached as an added safety precaution. The only material needed to make these supports is old boiler tubes which are cut and welded together.

L. B. McGEE (LA.)

Is a penny a day too much

OVEN OR ROOM CONTROL





Mr. H. Klank, the maintenance engineer of the American Laundry Machine Company plant in Chicago says that this Sarco KR-14 Room Control has been on this wood kiln for 27 years without repairs. He ought to know, because he put it on there.

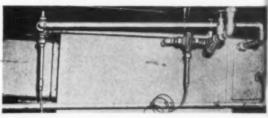
Recent reports include a Sarco Control in California overhauled after 24 years service and one in Cleveland in 25 years without repair and the owner figures that temperature control has cost him less than a cent a day.

OFFICE ROOM CONTROL

W. H. Barber, manufacturer of lubricating oils in Chicago, experienced difficulty with the office heating until the Sarco KR-14 room control with Sarco Float-Thermostatic Steam Traps were in stalled. Now "no trouble and don't expect any."



HEAT AND HUMIDITY CONTROLS



In baking, if it's not the heat-it's the humidity. This plant makes identical loaves of top quality bread day in and out because both heat and humidity of proof boxes are Sarco controlled.

LET THE SARCO ENGINEER NEAR YOU SUGGEST

SARCO SAVES STEAM

SARCO COMPANY, INC.

Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CAMADA, LTD., TORONTO S., ONTARRO

IMPROVES PRODUCT QUALITY AND OUTPUT

Aids to Proper Boiler Operation

By Joseph H. Drake

Reynolds, Smith, & Hills, Jacksonville, Florida

Boiler Access Doors

MAKE bottom of refractory section slope inward, to get rid of dust accumulation in door openings. Put sheet of solid plate over grating under each access door.

Minor Safety Item

NSULATE lines' which are intermittently hot (drains, sampling lines, etc.) from floor to a point 6 ft above at all grades where men might occasionally grab them inadvertently.

Stairways and Gratings

NORMAL placement of stairways is between boilers and on each side. Stairs at these points invariably interfere with hand lancing, soot blowers, and maintenance work in and around boiler. If they have to be placed between boilers, make them of multiple landings and short flights and locate them ahead or behind the area of the boiler which contains tubes and drums, Keep them away from soot blowers, drums, and lancing doors.

Make gratings as wide as possible, preferably the full width between boilers or between boiler and outside walls. Fifteen feet should be the minimum width where twenty foot hand lances are being used.

Provide runways at each grating level between boilers and between batteries of boilers.

Check anchoring of individual gratings.

Provide grating permitting access to water columns on three sides.

Superheater Outlet Drains

THE superheaters in most plants come to resemble spaghetti after a few years of operation. In most cases we believe this is due only to the operator's negligence in opening superheater outlet drain valves in time when flow from non-return valve approaches zero. The valves should be brought out to a point near the boiler board or near the water tenders control point, whenever possible.

Floor Drainage

CONCRETE floors almost always have low spots in them. Make specifications on floors stricter. Increase angle of drainage above that normally specified, and provide plenty of drain points. Design for hose washing of all floors possible, with adequate curbs at edges of floors.

See if manufacturers can be induced to furnish cast iron bases for pumps, etc. with an appreciable and effective slope toward large drain holes, which should be at the bottom of the back end of equipment base (not a horizontal hole through the front rim of the catchall).

Bury in concrete all drains which would otherwise run along floor. Nothing collects more dirt than a pipe in a corner above a floor.

Protection Controls

HEN possible, isolate electrical controls from pressure piping controls, to permit keeping electrical controls out of danger from dust, water, steam and oil. Give close attention to dust and water protection, in any case,

Dodging Wiring Pitfalls

By R. C. Roetger

THE maintenance man who is called upon to install some new wiring or alter existing equipment can frequently avoid a number of headaches if he will study the situation carefully before proceeding with the work. Outlined below are a few common pitfalls that can be dodged at the expense of a little foresight.

Codes and Ordinances

The first point to be sure of is that the contemplated work will pass the necessary inspections. For example, even a perfectly capable plumber's helper should not be allowed to do the job if local laws require that it be done by a licensed electrician.

Some physical aspects to be kept in mind are wire size for the intended load, type of insulation, circuits per fuse, and type of wiring. The last is a particularly important factor. In some cases a certain kind of wiring is acceptable on existing circuits, but the same type is not approved for new or additional work. To cite an actual example: some localities will permit an existing Bx cable job to remain when additions are planned. The new work, however, must be rigid conduit properly tied into the Bx part of the job at a junction box.

It is also important to select the proper type outlets and fixtures, such as explosion proof, weather proof, etc., and to make sure they are designed for the intended loads.

Connections

Many forms of solderless connectors for splices, terminals, and fixture connections are on the market and all are time savers and do an excellent job. Nevertheless it is

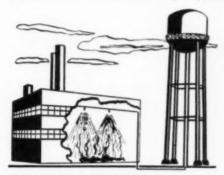


When "cost" is measured in losses due to a plant fire, the value of adequate safety measures is almost beyond price. Knowing this, many plant managers are making sure that their fire protection system has both the features it needs—automatic sprinklers and a water reserve stored in a Horton tank. For example, the 100,000-gal. Horton elevated tank shown at the right was installed recently at a Southern textile mill to provide gravity water pressure for the sprinkler system.

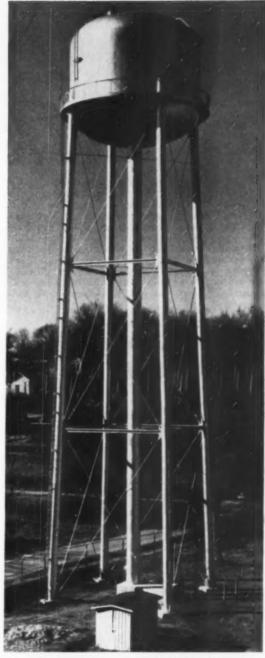
What does this safety cost? Your investment in a Horton elevated water tank is self-liquidating . . most installations pay for themselves in a few years through reduced fire insurance

premiums.

Horton ellipsoidal-bottom elevated tanks for use with sprinkler systems are built in standard capacities from 15,000 to 500,000 gallons. Write our nearest office for information or quotations on an elevated tank for your plant.



HOW A HORTON TANK WORKS: Water is stored above your plant. The instant a fire starts, water—under gravity pressure—sprays from the first sprinkler head that opens. The fire is quenched before it has a chance to gain headway. What may have been a costly delay becomes only a brief interruption.



CHICAGO BRIDGE & IRON COMPANY

Attente 3 2180 Heeley Bidg.

Birmingham 1. 1331 North Fiftieth 51.

Berton 10. 1044—201 Deventaire 51.

Heven 602 Angeles 17: 1545 General Petroleum Bidg.

Chicage 4 2107 McCormick Bidg.

Los Angeles 17: 1545 General Petroleum Bidg.

Covered 15. 2218 Guildhell Bidg.

New York 6 3121—168 Broadway Bidg.

Tulss 3 1628 Heart Bidg.

Plants is STAMINGHAM, CHICAGO, SALT LAKE CITY, and GREINVILLE, PA. is Conado—HORTON STELL WORKS, LIMITED, FORT ESTE, ONT

best to use only soldered joints on the end near any work benches or laboratory tables that are to be used for sensitive electrical instruments.

Although the solderless connectors would be very unlikely to fail or cause any power loss, oxidation and corrosion may in time result in small potential differences and transient currents in the joint. Such disturbances will be transmitted by the line and are apt to cause spurious response or "noise" in any sensitive instruments connected to it.

Filters

Closely related to the prevention of disturbances in instruments is the use of line filters located at the source of the disturbance. Commutator machinery and contactors are the worst offenders and if such equipment is planned, it is well to consider the use of filters at the outset of the job. If it

is possible to install them while the wiring is in progress a more workmanlike job will be achieved than if they have to be hung into the wiring later.

Filters usually consist of one or more capacitors, or capacitors and choke coils. In selecting a filter it is necessary that the voltage ratings of the capacitors and the current rating of the choke coils be suitable for the application.

Conduit

It sometimes happens that after a long conduit with intricate bends is installed it is impossible to get a wire through it because the snake hangs up on a coupling or in one of the bends. This can be avoided by pulling a piece of scrap wire through the conduit before bending and using it later to pull through the desired number of conductors.

It is also possible to insert the final wiring before bending but

there is always the possibility that the wire will be strained or the insulation damaged by this method.

General

Outlets intended for hand tools, etc., should be arranged so that the cords will cause the minimum of interference with the work or worker. They should also be placed so they cannot be hit by dollys or trucks.

If both direct and alternating current outlets are provided it is a good plan to attempt to standardize on a d-c connector that will not admit an a-c plug. Otherwise the d-c outlets should be painted red with the polarity indicated, or marked in some other distinguishing way.

Finally, color coding should be carefully followed, making sure the proper color is grounded when required and taking care not to inadvertently "switch" colors in a junction or outlet box.

Preventive Maintenance for Oil Filled Transformers

By R. W. Kirby American Enka Corp. Enka, N. C.

HERE is a definite need for preventive maintenance of oil filled transformers. The most practical and easy method of physical inspection of the transformer windings, insulation and oil is to take samples of the oil and test them. The condition of the oil determines to a great extent the condition of the transformer and indicates how well it is standing up under its load and environment. Recent oil tests were made on the transformers at American Enka Corp., Enka, N. C. Following below is a summary of observations and comments on this procedure.

Sample Taken

The first step taken was the obtaining of oil samples. These were taken from the drain valves or sample valves when possible. The drain valves were "stuck" on some of the small lighting transformers. In this case the lid was removed and the oil sample was taken by inserting a 36" glass tube, placing the thumb tight over the top end and removing the tube from the oil.

When taking the samples from the valves, enough oil was first drained to carry off any impurities which might have settled in the drain pipe and would not actually represent the true condition of the oil in the tank. Care must be exercised in carrying out this precedure to prevent moisture and impurities from entering the oil samples while they are on their way to be tested. Clean and dry eightounce sample bottles with cork stoppers were used as containers and two bottles full of oil were taken from each transformer as a sample for the tests. Three tests were made on the oil; dielectric strength, acidity, and color comparison.

Dielectric Test

This important test was made in the electric shop with a General Electric portable oil tester, According to the transformer manufacturers' specifications, the oil is considered to be in a safe operating condition electrically if it will stand a potential greater than 18 kilovolts between the two test discs. These discs have a diameter of one inch and are spaced onetenth of an inch apart. They are mounted in the testing cup that is supplied with the oil tester. One break-down test was made on each of three cups of oil, and the average taken as the correct dielectric strength of that sample,

Acidity Test

A small sample of the oil from each transformer was taken to the Chemical Laboratory for acidity test. The acidity of the oil is expressed as milligrams of potassium



IN 4 PLANTS

FEDDERS-QUIGAN PLANT Buffalo, N. Y. Heating men everywhere are being served by the talent, experience, man power and facilities housed in these 4 Fedders-Quigan plants. They are built on a foundation of quality products, satisfactory performance and volume sales.

FEDDERS-QUIGAN PLANT Trenton, N. J.

fedders

FEDDERS-QUIGAN PLANT Newark, N. J. Write for data on Fedders Unit Heaters, Convector-Radiators, Wall Radiation and Baseboard Radiation for home, commercial, industrial and institutional needs.

FEDDERS - QUIGAN

BUFFALO 7, NEW YORK

hydroxide per one gram of oil. It is the amount of potassium hydroxide required to neutralize the acid in a given amount of oil. Transformer manufacturers specify that an acidity number of 1.05 KOH or less is satisfactory, providing the other tests are up to requirements.

Color Test

A group of twelve color samples representing different stages of transformer oil that has been in use was obtained from a transformer manufacturer. The range in color change is from clear to dark brown and corresponding numbers are: 0, ½, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5 and 6. It has been learned from experience here at Enka that oil having a color number of 3½ or below on the clear side is satisfactory for continued use provided tests other than discoloration are also satisfactory.

Discoloring and Effects

It is not difficult to obtain the required initial characteristics of transformer insulating oils, But it is a difficult problem to insure that those characteristics will remain during the future years of the expected life of the oils. The complex nature of mineral oil makes it very susceptible to oxidation. This causes the formation of alkalies, sulphates, and mineral acids. These products are dark in color, therefore color change is a good indication of oxidation and possible formation of sludge.

Sludging and Effects

Sludge is principally an oxidation product and its formation is accelerated by high temperature and the entrance of moisture into the oil. Sludge formation precipitates in the transformer, covering the coils, bottom of the tank and oil circulating tube surfaces. This prevents free circulation of the oil by partially restricting the flow which in turn lowers the heat dissipation, causing the operating temperature to increase, then more sludge is formed. This condition indicates a need for filtering the oil to remove this foreign matter.

Filtering

A portable oil filter or centrifuge is useful in removing most of the sludge and some of the moisture from the transformer oil. A General Electric portable filter was used in this particular case. There are two ways of accomplishing this filtering: (1) by removing the oil from the bottom of the transformer tank, circulating through a filter and back in to the top of the tank, or (2) by draining from the bottom, pumping through a filter into a clean oil barrel, then reversing the process by pumping back through filter in the top of the tank. The latter method should be used whenever possible because it is quicker and more thorough, Both methods were used at Enka.

When filtering or changing the oil, the coils and inside of the tank were flushed with clean oil to carry away any sludge which may have settled there.

If the oil is sludged to a great extent, even after filtering, more sludge will soon form. Therefore, it would be more economical to drain the old oil and put in new in this case.

Conservator and Gas Filled Types

The conservator type transformers and gas filled units practically prevent the entrance of air and moisture. Therefore, it is not recommended that these types be filtered unless careful tests show that it is absolutely necessary. Great caution must be observed in this case to prevent the entrance of air and possibly moisture which would defeat the purpose of having a sealed unit.

Changing Oil

If the transformer has a capacity of ten gallons of oil or less and it needs to be filtered, it would be more economical to change the oil than to filter it when the labor of two men and the process of moving the filtering equipment is considered.

When filtering or changing oil, no rubber hose or rubber fittings are to be used because the oil reacts with the sulphur in the rubber and in time it will turn it into a gummy, sticky mass. Synthetic or flexible metal hoses are to be used.

Transformer manufacturers specify as a safety precaution that you should never drain the oil from a unit when it is energized or under a power load. However, very lightly loaded units, large as 150 kva, were completely drained, flushed and refilled with no noticeable after effects. NOTE: This is not a good practice and should be considered only as an emergency procedure. The units should never be allowed to stand for any period of time without oil, whether energized or not. If unloaded, the coils absorb moisture and if loaded, the heat generated in the coils is likely to reach a dangerous value.

Test Guides

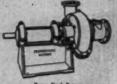
The recommended time between tests depends on climatic conditions, strain which the unit is under, and the importance of minimizing interruptions of service. It is a good practice to run oil tests at least once a year under normal operating conditions and where service is severe it is advisable to test every six months.

Plant Program

The study of the characteristics and behavior of transformer insulating oils has been going on for as long as they have been in use in transformers. Yet it is hard to say just when the oil has reached its useful dependable life. Therefore, operating engineers set up standards of their own which comply with the individual maintenance schedule and which they have found to be most economical. Here at Enka the transformer manufacturers' specifications are followed very closely in making oil tests. A dielectric strength of 18 kv or greater, color number of 31/2 or below and an acidity test of 1.05 koh or below have been found to be safe conditions for continued operation until the next test. All three tests must be considered together to determine the true condition of the oil.

These tests are made once a year for normally operating units. A unit showing an abnormal or doubtful condition of the oil is checked again in six months. If the situation gets worse, steps are taken to correct it.

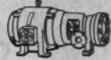
The above procedure thus far has proved to be a very practical and satisfactory method of preventive maintenance for the oil filled transformers at this plant.



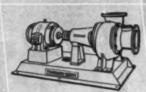








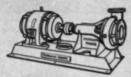














for Pumps... THAT DELIVER plus performance lasting dependability

The Fairbanks-Morse Pump Dealer is your best bet for assistance in pump selection...for reliable service. Fairbanks, Morse & Co., Chicago 5, Ill.

unsurpassed economy



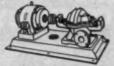


FAIRBANKS-MORSE

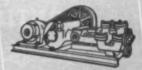
A name worth remembering

DIESEL LOCOMOTIVES + DIESEL ENGINES + PUMPS + SCALES MOTORS + GENERATORS + STOKERS + RAILROAD MOTOR CARS and STANDPIPES + FARM EQUIPMENT + MAGNETOS









From the Small

POWER PLANTS



to the BIG ONES



THE COAL HANDLING ANYWHERE
Specify Borning

BELT CONVEYORS - BUCKET ELEVATORS - SCREW CONVEYORS

APRON CONVEYORS - FEEDERS - ACCESSORIES

CONTINENTAL GIN COMPANY



ATIANTA . DALLAS . MEMPHIS . NEW YORK



MANUFACTURERS

NEWS

FOR SOUTHERN INDUSTRY

Small Industries Clinic-Georgia

The organization of SMALL INDUS-TRIES CLINIC, production and management consultants to serve Georgia industry, has been announced. Mr. FRANK J. JOHNSON. BOX 3. BROOK-HAVEN, GEORGIA, is the newly elected president

The clinic is designed to serve those firms which are too small to employ a full time industrial engineer, yet require occasional industrial engineering services. It is operated by registered professional engineers specializing in time and motion study, methods engineering, production control, work simplification, plant layout, and other phases of industrial plant operation and mainte-

Mr. Johnson is head of the industrial technology department at SOUTHERN TECHNICAL INSTITUTE, the Chamblee, Georgia, unit of Georgia Tech. He is a registered industrial



Frank Johnson

engineer, a graduate of North Carolina State college and has had 11 years engineering and production experience in the chemical, plastics and furniture manufacturing industries.

FUTURE EVENTS

Of Engineering Interest

AMERICAN SOCIETY OF MECHAN-ICAL ENGINEERS, Sec'y, 29 West 39th St., New York, N. Y. Sept. 25-27, New Orleans Section 1950 Conference, New Orleans

INSTRUMENT SOCIETY OF HE INSTRUMENT BUCLERS
AMERICA, Sec'y. 921 Ridge
Ave. Pittsburgh 12, Pa.
Sept. 18-22, Fifth National Instrument Conference and Exhibit,
Memorial Auditorium, Buffalo,

N. Y.

AMERICAN PETROLEUM INSTITUTE, See'y, 50 West 50th St.,
New York, N. Y.
Sept. 25-27, Petroleum Mechanical
Engineering Conference, Hotel

Engineering Conference, Hotel Roosevelt New Orleans, La AMERICAN SOCIETY FOR METALS, Wm. If Eisenman, 7301 Euclid Ave., Cleveland, Ohio. Ozt. 23-27, National Metal Congress and Exposition, International Amphitheatre Chicago, Ill.
MATIONAL POWER SHOW, International Exposition Co., Grand Central Palace, New York 17, N. Y.

N. Y.

Ney. 27-Dec. 2, Grand Central
Palace, New York, N. Y.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS, M. C.
Turpin, Sec. 4. 60 West 40th
St., New York, 18, N. Y.

Dec. 3-6, Annai Convention, Hetel Commodere, New York, N. Y.

A.S.M.E.—Piedmont Section

New officers of the Piedmont Section of the American Society of Mechanical Engineers for the 1950-51 section year have been announced by the Section's nominating committee. They were presented to the membership at the June Meeting held at the Mecklenburg Hotel in Charlotte, on May 26.

A. W. Dunbar, General Superintendent, Tomlinson of High Point, Inc., was named Chairman. Hunter Hughes, Regional Editor, Southern POWER & INDUSTRY, Rock Hill, S. C., is the new Vice-Chairman, and Kenneth Redman, Redman Engineering Co., High Point, N. C., is Secretary-Treasurer. The new Executive Committee is composed of Arthur B. Capper, Jr., Mill-Power Supply Co., Charlotte, N. C.; Wallace Evans, Celanese Corp., Rock Hill, S. C.; Austin C. Thies, Duke Power Co., Charlotte, N. C.; Mebane Turner, R. J. Reynolds Tobacco Co., Winston-Salem, N. C.

The American Society of Mechanical Engineers is a national engineering society founded in 1880. It has more than 20,000 members and 75 sections. The Piedmont Section includes all of the area from Winston-Salem and High Point, N. C., south to Rock Hill and Lancaster, S. C. There are approximately 150 graduate mechanical engineers in the Sec-



More Power to America Special

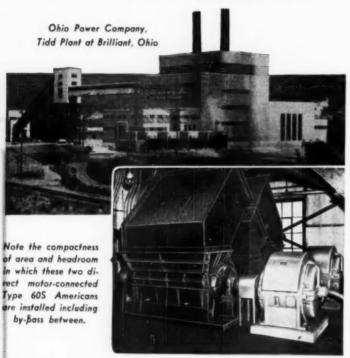
The General Electric Company's More Power to America Special is now on a 1950-1951 nation wide tour visiting approximately 150 key industrial centers.

Almost a quarter-mile long, the 10-car exhibit train represents the first attempt to display, in one series of related exhibits the complete range of products for the production, distribution, and industrial utilization of electric power.

The train will not be open to the general public, as the exhibits have been designed specifically to interest those who produce electric power and those who put it to work in industry.

Exhibits on the "Special" are grouped in 11 major sections: power generation, transmission, and distribution; drives and controls, materials handling, welding, industrial heating, renewal parts, industrial lighting, components for industry, measurements, civic improvement, and national security.

COAL PREPARATION at 1000 TONS per HOUR with TWIN AMERICANS



AND THE COMPLETE CRUSHING UNITS OCCUPY ONLY 12'x12'x12'

110,000 kilowatt output represents converting 1200 tons of coal per day into power... Continuous pulverizer feed from bunkers kept at constant level by conveyors from the two "Type S, No. 60" American Ring Crushers which reduce the 16" ROM bituminous coal to a 34" product. Direct-connected (to 200 HP 720 RPM motors), the Americans employ efficient shredder ring action with an unusually conservative power demand.

The uniform product and the dependability of Americans are considered essentials to the unfailing, high output of the Ohio Power Co. and other plants throughout the world. Americans offer a complete crushing plant in one compact unit, no auxiliary crushers or refuse picking operations are required.

Send for the facts on efficiency of coal properation in power plants with American Crushers.

PULVERIZER COMPANY

Originators and Manufacturers of

Ring Crushers and Pulverizers

ST. LOUIS 18. MO.

Adam Cook's Sons Inc.— Southeastern Representative

ADAM COOK'S SONS INC., manufacturers of Albany Lubricants, of Linden, N. J., announce that McCarty & Co. of Orlando, Florida, now represent them in North and South Carolina in addition to Georgia and Florida. McCarty & Co. have represented Adam Cook's Sons, Inc., since July, 1948, according to A. R. Lang, General Sales Manager of the manufacturer.

Wagner-New Orleans

Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis 14, Mo., has established a sub-branch of the St. Louis Sales Office in New Orleans, La. The new office, which is under the direction of Mr. N. G. Alvis, is located at 227 International Trade Mart. The new branch is expected to provide more convenient field engineering service for users of Wagner electrical apparatus in the New Orleans area.

American Brass— Southern Appointments

THE AMERICAN BRASS COMPANY, Waterbury, Conn., has announced the opening of the company's copper building products mill depot at ATLANTA, GEORGIA, and the appointment of three new District Sales Managers who will serve the area: D. CLARK GAGER, ATLANTA; JOHN B. LAPOINTE, CHARLOTTE; and CHARLES P. DURFEE, MIAMI.

Dowell Promotions

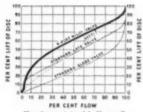
Four major promotions in the Dowell Incorporated field staff have been announced.

W. N. "WOODY" ESTEL, District Manager for Dowell in MIDLAND, TEXAS, has been promoted to Sales Development Manager and will transfer into the TULSA GENERAL OFFICE.

RALPH H. SMITH, District Manager in the HOUSTON, TEXAS, area has been moved to Midland to head up Dowell's activities in the West Texas area.

JOHN S. "JACK" TALBOT, District Sales Engineer in Houston, has been promoted to manager of that district and E. F. Kelly, Houston Development Engineer, has been promoted to District Engineer.





Flow characteristics of the Honeywoll Hi-Lift Hand Coistral Valve for surpms those of conventional designs ... offer fixterable comparison to the precision of such diaphraym operated values as the Honeywoll



The Honeywell Hi-Lift Hand Control Valve is ideal for use where automatic regulation is not necessary or advisable. Designed to afford micrometer adjustment of flow, it contains an indicating scale to show percentage of stem travel to 1% and an inner valve capable of responding to such close correction. Inset illustration shows the simple and easy-to-read scale and the curve at left portrays the superior flow characteristics of the Hi-Lift over conventional valve designs.

The Honeywell Hi-Lift is available with v-port or parabolic discs...in sizes from ¼" to 12"...straight through or angle...for pressures up to 600 lbs...with body of Bronze, High-Tensile Iron or Cast Steel...and with Bronze or Stainless Steel trim. Available, too, with electric motor for remote control applications.

Call in your local Honeywell engineer for detailed information about the Hi-Lift and such other Honeywell Process Control Specialties as: Transfer Valves, Liquid Level Devices, Cylindrical Plug Valves and the Honeywell Space-Saving Bypass.

Write, today, for a copy of Bulletin #242-1!

MINNEA POLIS-HONEYWELL REGULATOR Co., Industrial Division, 1902 Windrim Avenue, Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.



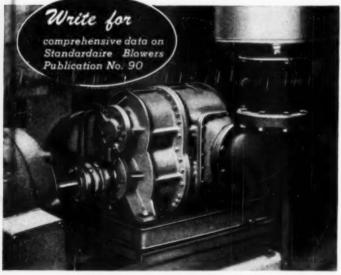
The STANDARDAIRE PRECISION BUILT Axial Flow BLOWER ~



Here's another important design feature of the Standardaire Blower — HEAT TREATED ALLOY STEEL TIMING GEARS—generated and shaved to extreme accuracy for quiet operation.

THESE helical gears keep the cycloidal form, screw type rotors of the Standardaire Blower in timed relation. There is no wind-up

in the shafts between the rotors and gears as a very small percentage of the in-put power goes through the timing gears. The male or main rotor does the work and consumes the power; the female rotor acts simply as a valve or gate—further evidence of the finer features found only in the Standardaire Blower. The Standard Stoker Co., Inc. Dept.—C-23 Lexington Ave., New York 17, New York.



Typical installation of a Standardaire Blower as installed in a malting plant.

THE STANDARD STOKER CO . INC .



NEW YORK · CHICAGO · ERIE · MONTREAL

Allis-Chalmers-Memphis

FREDERICK H. WOODRUFF has been named a sales representative in AL-LIS-CHALMERS' MEMPHIS district office. Woodruff, who holds a bachelor of electrical engineering degree from the Georgia Institute of Technology and a bachelor of science degree in mathematics from the University of Chattanooga, enrolled in Allis-Chalmers' graduate training course in October, 1948. He is a member of the-American Institute of Electrical Engineers.

National Power Show

THE NATIONAL ASSOCIATION OF POWER ENGINEERS will hold its 49th annual NATIONAL POWER SHOW and its 67th annual convention at the Hotel Jefferson in Sr. Louis, Mo., August 15 through August 19.

Among the features of the 1950show will be an extensive industrial film program, a large number of educational exhibits and round tableclinics at which each exhibitor may bring up his problems or ideas.

The show is under management of Brede, Inc., of Minneapolis, Minn. John C. Toohy, 176 W. Adams St., Chicago, is exhibit manager.

New SSIRCO Branch in Memphis

SOUTHERN STATES IRON ROOFING COM-PANY has begun operations at its new plant and distributing warehouse in. MEMPHIS, TENNESSEE. The modern. 40,000-square foot building was recently completed at a cost of approximately \$135,000. It is a brick on steel structure. The sales office is airconditioned. Fluorescent lighting isused throughout the building.

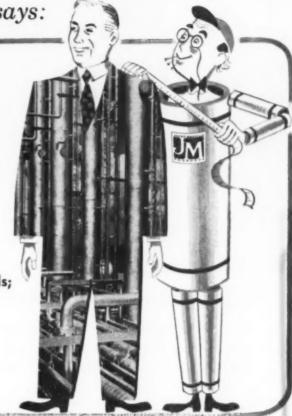


The branch, the firm's thirteenth in the South, manufactures aluminum and steel roofing and distributes a broad line of nationally-known building products. Plans for the building were drawn by Hanker & Heyer, architects. TriState Construction Company was the general contractor. M. L. Perk is manager.

Mr. Insulation says:

"Buying insulation is like buying a suit of clothes:

-the better the materials: the more expert the tailoring, the better your investment"



Just as no one cloth can be used for every suit of clothes, there is no one raw material that can serve as the ideal insulator for every industrial insulation job.

For this reason, Johns-Manville manufactures a wide variety of industrial insulations-of asbestos and other raw materials-each of which is designed for a special purpose. These insulations span the entire range of temperatures from 400 F below zero to 3000 F above.

But, again, there is much more to the story of insulations than their manufacture. In order

to get the greatest return from your investment in them, they must be expertly engineered to the job, and then skillfully applied.

Johns-Manville makes available to you the service of experienced insulation engineers, and highly skilled mechanics for the proper application of Johns-Manville insulations.

If you are contemplating an insulation installation for your plant, it will pay you to look into this Johns-Manville insulation service. For further information just write Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville first in





HEAT'S on . . .

R & M HOISTS deliver

Nine R & M hoists give super service in scorching temperatures on the pouring floor of a foundry in Ironton. Every day these hoists move from 350 to 400 tons of molten metal from furnace to flask. A special bearing is used in the block because of the sizzling heat. In photo, note low headroom required. This is characteristic of R & M hoists. Every day these hoists meet the grueling requirements of this foundry and thousands of other plants. They up production, lower unit costs, increase profits.

"TAKE IT UP WITH R & M"

From the new "J" hoist, with its 1/4-ton capacity, to 25-ton cranes, R & M manufactures a wide range of versatile handling equipment for the toughest work. If it's a job for a hoist, crane or winch . . . Take it UP with R & M.



Electric Hoists
Capacities From
250 to 20,000 lbs.

WRITE OR WIRE FOR DETAILS

ROBBINS & MYERS · INC.

. HOIST & CRANE DIVISION .
SPRINGFIELD 99, OHIO . BRANTFORD, ONTARIO

Edwards Joins Boiler Equipment

Boiler Equipment Service Company, 686 Greenwood Ave., N. E., Atlanta, Georgia, has announced the addition of John W. Edwards to its staff. Mr. Edwards will first be employed in the service department, specializing in electrical and electronic applications, and later he will be engaged in sales work.

Mr. Edwards, an electrical engineering graduate of Duke University, has had electrical controls and interior communications experience in the Navy, and was formerly with the Packard Motor Company in Detroit, Arabian American Oil Company in San Francisco, and served as apprentice engineer with Hardy-Burlington Mining Company in Kentucky.

Onan Names Memphis Distributor

D. W. Onan and Sons Inc., Minneapolis, Minnesota, manufacturers of electric generating equipment, has announced the appointment of the Hawkins Equipment Company of Memphis, Tennessee, as distributors of Onan products in the Memphis trading area in the states of Tennessee, Kentucky, Arkansas and Missouri.

The Hawkins Equipment Company is located at 1475 Thomas Street, Memphis, Tennessee. Mr. W. C. Hawkins is president fo the firm and Mr. S. P. WILEY is general manager.

Lee Appoints Southern Representative

DAVID L. CUSHING has joined the REPUBLIC RUBBER DIVISION, LEE RUBBER & TIRE CORPORATION, Youngstown, Ohio, as a Field Engineer.

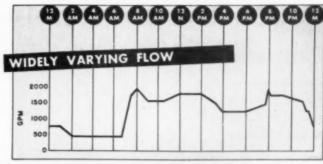


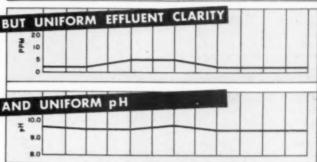
David Cushing

Mr. Cushing will represent the company in territory embracing the entire State of LOUISIANA, and parts of Florida, Mississippi and Alabama.



A Day in the Life





GRAVER Reactivator

WATER CLARIFIER AND SOFTENER

The above graphs show the uniform results being obtained from a GRAVER Reactivator with widely varying flow at an installation treating a turbid surface supply.

Such results are typical of GRAVER Reactivators, for in installations throughout the country, these units maintain constantly higher clarity and quality of effluent through sudden or wide changes in flow rate and water consumption.

Highly efficient upflow clarification and softening is obtained due to the following exclusive design features . . . high rate sludge recirculation . . . upflow sludge filtration through a concentrated zone of accumulated precipitates . . . positive continuous sludge removal.

Write for catalog describing GRAVER Reactivators in detail, and ask for advice on your particular water problem. Specific recommendations from the long-experienced GRAVER engineers and chemists are offered without the slightest obligation.



It's the same story
DAY AFTER DAY
YEAR AFTER YEAR



GRAVER WATER CONDITIONING CO.

216 West 14th Street, New York 11, New York, U. S. A.

GW 421

A DIVISION OF GRAVER TANK & MFG.CO. INC. EAST CHICAGO, IND.

New Method Gives Precise Control in Air Conditioning

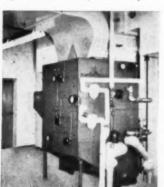
Niagara "Controlled Humidity Method" Uses Hygrol, Hygienic Liquid Absorbent

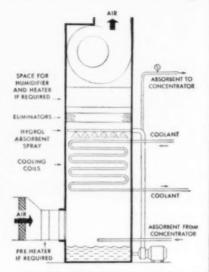
• The Niagara "Controlled Humidity Method" is a new system of air conditioning giving complete control of temperature and relative humidity, holding constant conditions or varying them at the will of the user. Especially, it provides dry air at normal atmospheric temperatures with little or no refrigeration required. A condition of 15 grains of moisture per pound of air at 85 deg. F. dry bulb temperature has been produced without refrigeration.

The apparatus is enclosed in a casing thru which the air is drawn by fans. The air is

filtered and then enters a chamber where it is dehumidified in passing thru a spray of "Hygrol" Liquid (a hygienic hygroscopic chemical that absorbs the air-borne moisture and contains no salts or solids to precipitate). In the same chamber are located cooling coils which remove the latent heat of evaporation and also sensible heat as required.

The absorbent liquid spray falls into a tank at the base, where it is piped to a concentrator, removing moisture taken from the air. The re-concentrated liquid returns to the system. This proc-





NIAGARA CONTROLLED HUMIDITY METHOD - FLOW DIAGRAM

ess is continuous, and the apparatus operates at full capacity at all times.

The same equipment may be used to provide winter air conditioning when required, by installing a tempering coil at the outdoor intake, an humidifier, and a reheat coil above the eliminators.

This equipment is manufactured in a range of sizes providing from 1000 to 20,000 CFM of conditioned air from a single unit, and mutiple unit installations are practical. It is expected that, by reducing the need for refrigeration, the cost of air conditioning will be reduced by this method. Applications generally are in a temperature range from 35 deg. F. upward. Below the freezing temperature of water, the Niagara "No-Frost" method is applicable.

The equipment is protected by U. S. and foreign patents. Installations have been made in food and chemical process industries, in packaging hygroscopic products, for preventing condensation of moisture on metals and other products in storage, in air conditioning for laboratory control and for human comfort.

For further information, write Niagara Blower Company, Dept. SP, 405 Lexington Ave., New York 17, N.Y.

Farris Engineering Corp.—Georgia

Mr. D. B. Gooch of D. B. Gooch Associates, 2008 First Ave. North, Birmingham 6, Alabama, has been appointed as exclusive representative in Georgia for the Farris Engineering Corporation, Palisades Park, N. J. Mr. Gooch has had extensive experience in industrial plant operations as well as in safety valves and their application.

Cyclotherm Appoints Distributors

CYCLOTHERM CORP., manufacturers of packaged type steam generators, has announced the appointment of the following new distributors: Rum-BOLD AND COMPANY, INC., 379 Nelson St., S. W., Atlanta, Georgia for Geor-GIA; GENERAL INDUSTRIAL SUPPLY CORP., P. O. Box 243, Fort Worth 1, Texas for Western Texas: Royster H. JOHNSON Co., P. O. Box 1831, Charlotte 1, N. C., for North Caro-LINA and SOUTH CAROLINA; DEMPSTER BROTHERS, Knoxville 17, Tenn., for TENNESSEE; and AIR CONDITIONING ENGINEERS, INC., 152 St. Louis Street, Mobile, Alabama for Lower ALA-BAMA, MISSISSIPPI and NORTHERN FLORIDA.

Wagner Electric Divides Territory

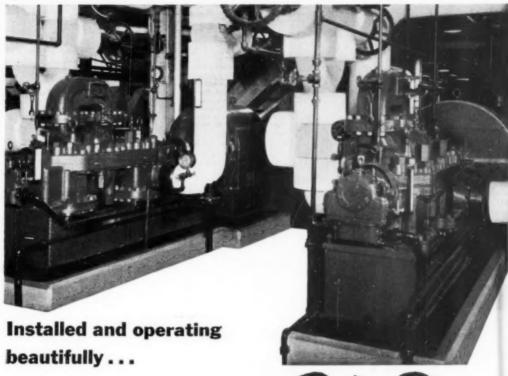
The southern portion of the sales territory served by the St. Louis electrical division branch of Wagner Electric Corporation has been set



A. C. Allen

up as a separate unit, with headquarters in Memphis and a sales office in New Orleans. Mr. A. C. Allen will remain at Memphis as branch manager of the newly established territory.

The remaining territory, with a main branch in St. Louis and a subbranch in Indianapolis, will be under the direction of Mr. J. J. SCHEID.



TWO WARREN BUY BOYS

CENTRAL Maine Power Company has had many years of successful experience with Warren Pumps. Among the recent installations are two Type TH high pressure pumps at their enlarged Mason Steam Plant, Wiscasset, Maine. They are operating at capacities of 325 and 550 g.p.m. against a pressure of 900 p.s.i.g. These pumps are also available with a capacity up to 850 g.p.m. and a pressure range up to 1200 p.s.i.g. . Every construction and material feature of these

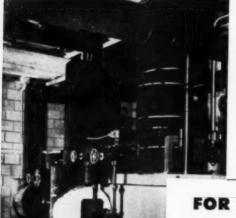
Warren Pumps contribute to the highest dependability and efficiency, long life and low maintenance, with special emphasis on safety. They will prove a sound investment over the years, as numerous other Warren Pumps have in this and many other central power stations, industrial plants, municipal and Federal projects.

Write for Bulletins 241 and 244 giving complete details on Warren Pumps for higher pressure services.

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC., WARREN MASSACHUSETTS

SOUTHERN POWER & INDUSTRY for JULY, 1950



IN THE NEW antibiotic building of Parke, Davis & Company, Detroit, Michigan, orpomples Pipe and Fitting Insulation has been used on the pipe lines. A finish will be applied over the insulation and painted to match the interior color softems.

FOR YOUR
PROCESSING
EQUIPMENT . . .

the long life insulation . . . PC FOAMGLAS

 On indoor and outdoor piping, towers, tanks, and other processing equipment, Foamglas helps to maintain predetermined temperature levels, to minimize condensation.

The cellular glass structure of Foamglas makes it an exceptionally effective insulation. And, being glass, it has unutually high resistance to moisture, vapor, acid atmospheres and other destractive elements. The resultant freedom from repairs, maintenance and replacement makes Foamglas a truly economical insulation. When properly installed, Foamglas *retains* its original insulating efficiency.

When you are figuring on insulation, make sure you have the latest information on PC Foamglas. You will find it in our recently published booklet which contains descriptive text and photos of recent jobs, charts, tables, up-to-date specifications and installation instructions. Just send in the convenient coupon and you will receive promptly a sample of Foamglas and your copy of our booklet.

This is FOAMGLAS®

The entire strong, rigid block is composed of millions of sected glass bubblist. They form a continuous bubblist have form a continuous resistance to moisture, vapor and acid atmosphere, is noncombustible, vermipproof and adorless. In those closed glass cells, which contain still air, lies the secret of the material's long life insulating efficiency.



Pittsburgh Corning Corporation.
Dept. AB 70, 307 Fourth Avenue
Pittsburgh 22, Pa.
Without obligation on my part, please
send me a sample of Foamglas and
your free booklet on PC Foamglas
Industrial Insulation.

Address State



FOAMGLAS INSULATION

When you insulate with FOAMGLAS ... the insulation lasts!

Graver Appoints Florida Representative

Graver Water Conditioning Co., Division of Graver Tank & Mfg. Co., Inc., manufacturers of equipment and materials for water softening and liquid conditioning processes, announces the appointment of Tom Charbonneau as Florida representative.

Mr. Charbonneau has had extensive experience in water conditioning problems in the southeastern states. For many years he has been engaged in sales and supervising work on treatment of boiler feedwater, consulting work on waste recovery, municipal water plants, etc., and he is a member of the American Water Works Association.

Mr. Charbonneau's headquarters are at 305 W. Colonial Drive, Orlando, Fla.

Erie City Iron Works Appoints Schrader

THOMAS O. SCHRADER, JR., was recently appointed Sales Manager of the Eric City Iron Works, Eric, Pa.

Mr. Schrader, a native of Allentown, Pa., is a graduate of Tri State



Thomas O. Schrader

College of Angola, Ind. He served seven years with the Fuller Lehigh Co., Allentown, Pa., as a pulverized coal engineer. In 1929 he joined the sales engineering staff of the Erie City Iron Works. In 1932 he was appointed to head the Pittsburgh Sales Office of the Erie City Iron Works.

He succeeds Mr. Dudley Selden, who has been Sales Manager for the past 15 years and is retiring from active sales work.



In dust and fly ash recovery

MULTICLONE COLLECTORS

and only Multiclones give vital advantages like these ...

o wonder "MULTICLONE" is the leading name in the centrifugal recovery of dust and fly ash from all types of gases, hot or cold.

No other mechanical recovery equipment has so many years of dust and fly ash recovery experience behind it . . . or has such uniformly high collecting efficiency . . . or provides so many other money-saving, space-saving advantages as MULTICLONE. The four advantages outlined below are by no means the complete MULTICLONE story, but are typical of the vital savings found exclusively in MULTICLONE equipment . . .

Uniformly High Recovery:

MULTICLONE'S multiple small diameter tubes—made possible by its exclusive vane design whirl the dirty gases with greater centrifugal force, thus throwing out not only the large, medium and small particles, but also a high percentage of the extremely small particles of 10 microns and less. This, coupled with the fact that there are no pads or filters to become choked with recovered material, results in a more complete recovery of all suspended materials from the gas stream.

Maximum Adaptability:

In addition to its unusual compactness, the MULTICLONE is also unusually adaptable to various installation requirements. Where head room is low it can be in-stalled with side-inlet side-outlet connections. Where side clearances are restricted, it can be installed with side-inlet top-outlet connections. In addition, without changing capacities, the shape of the unit can be varied - long and narrow, short and wide, or square-to fit restricted spaces ... and its single-inlet singleoutlet duct requirements permit greater flexibility and simpler installation. These savings slice installation costs, space requirements and insulating expense.

Space-Saving Compactness:

Plant space costs money -so be sure to check space requirements carefully. As shown in the accompanying chart, the MULTI-CLONE requires less floor space and less cubic space than any other unit of comparable capacity and performance. Translate these savings into today's high costs for plant space and you readily see the great importance of this one MULTICLONE advantage alone!

Make	Space Requirements in Sq. Ft. In Cu. Ft.		
Multiclose	1.0	1.0	
Cellecter A	2.1	1.8	
Collector B	5.9	3.2	
Collector C	6.8	0.3	

Minimum Maintenance:

The MULTICLONE has no high speed moving parts to reno pads or filters to clean or renew nothing to choke the gas flow or increase draft losses as suspended materials are recovered. MULTICLONE draft losses remain uniformly low at all times. Further, the recovered material from an entire bank of tubes is collected in a single hopper-far easier to service and maintain than the multiple hoppers of conventional cyclone units.







FREE INFORMATIVE BOOKLET

FREE INFORMATIVE BOOKLET This 32 pope booklet outlines the basic principles of centrifugal dust recovery and shows the many ways MULTICLONE advantages assure higher recovery at lower overall costs. A free copy of this booklet will gladly be sent on request. Write todays

Before you decide on any recovery equipment be sure to get complete information on MULTICLONE advantages. A letter, wire or phone call to our nearest office places this information in your hands without obligation. Get all the facts and you will get MULTICLONE Collectors!



01: 1052 WEST HINTH STREET, LOS ANGELES 18, CALIFORNIA CHRYSLER BLDG., NEW YORK 17 . I LuSALLE ST. BLDG., 1 N. Lu SALLE ST., CHICAGO 2 . HOBART BUILDING, SAN FRANCISCO 4, CALIFORNIA PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ BLDG., MONTREAL

B & W Tube Company— Fabricating Work

Plans to enter the field of limited fabrication of seamless and welded tubing, in addition to its primary work of manufacturing such tubing, have been announced by THE BAB-COCK & WILCOX TUBE COMPANY.

The types of fabrication to be handled under the new policy will include bending; end forming such as swaging, upsetting, flaring and expanding; flash-butt-welding for safe-ending and making long length tubin; the production of tubing with va-

rious cross section shapes and other specialty tube work.

Allis-Chalmers-Charlotte

JOHN J GREAGAN, JR., has been assigned to Allis-Chalmers Charlotte district office as a sales representative. An electrical engineering graduate of Alabama Polytechnic Institute, Greagan enrolled in Allis-Chalmers' graduate training course in 1948. Prior to joining Allis-Chalmers, he was employed by the Alabama Power Co. for over two and one-half

years. Greagan is a member of the American Institute of Electrical Engineers. He is a son of John J. Grea-GAN, special representative in Allis Chalmers Birmingham district office.

Reynolds Metals Buys Control of SSIRCO

REYNOLDS METALS COMPANY has purchased the controlling interest in Southern States Iron Roofing Company, manufacturer and distributor of building materials. Purchase price is reported to be around \$2,000,000. The announcement wa: made by F. O. Wahlstrom, president of Southern States Iron Roofing Company, and Richard S. Reynolds, Jr., president of Reynolds Metals Company.

Mr. Wahlstrom stated that the purchase will not affect the present personnel of Southern States. The company will continue to operate as a separate company under its present management.

Southern States operates branch warehouses in Birmingham, Ala.; Atlanta, Albany and Savannah, Ga.; Memphis and Nashville, Tenn., Jacksonville, Orlando and Tampa, Fla.; New Orleans, La.; Hattiesburg, Miss.; Columbia, S. C.; Rateigh, N. C.; Louisville, Ky.; and Richmond, Va.

1951 Instrument Exhibit Scheduled for Houston, Texas

The Houston, Texas, chapter of the Instrument Society of America announced at their June 20th meeting that the 1951 I.S.A. national exhibit and technical meeting will be held September 10-14, at the Coliseum in Houston, Texas.

W. H. Fortney, chairman for the committee handling arrangements, discussed plans for the convention. Mr. Fortney is the instrument foreman at the Humble Oil & Refining Company's Baytown Refinery.

This will be the first national I.S.A. convention held west of the Mississippi River. Attendance at past conventions has included industrial leaders from all over the world. It is expected that this will be the largest technical symposium and exhibit ever held in Houston.

On a national scale the following societies are cooperating on the convention plans: American Society of Mechanical Engineers, American Institute of Physics, American Institute of Electrical Engineers, Institute of Radio Engineers, National Telemetering Forum, and the Scientific Apparatus Makers Association.



Hot-dip galvanizing forms a perfect bond between iron or steel and hot, molten zinc. This provides positive protection against rust—gives your product more sales appeal. DIXISTEEL Hot-Dip Galvanizing is uniform; has small, tight spangles, no fins. It will withstand severe bends without cracking or flaking. Same high quality as used on our own products.

Write for quotations on this superior service. Give full details of materials, including dimensions.

FREE BOOKLET: "Hot Tips" on Hot-Dip Galvanizing ON REQUEST.



Do it the EASY way Standardize on POWELL VALVES

When you get your valves from various sources, buying for replacement—and stocking spare valves and parts—becomes unnecessarily complicated.

But when you buy ALL your valves—Bronze, Iron, or Steel, and, if you need them, Corrosion-Resisting Valves—from ONE source, you have the answer to your flow control problems. Powell makes them all* and makes them better. Also Powell makes the only COMPLETE Line of Valves for Corrosion-Resistance available to Industry today.



Fig. 11313 W. E. — Class 1500pound Cast Steel Pressure Seal Gate Valve with welding ends, venturied ports and special bypass. Bevel gear operation. Also available with top-mounted electric motor operator.



Fig. 1793 — Large 125-pound from Body Bronze Mounted Gate Valve. Flanged ends, botted flanged yoke, outside screw rising stem and tapered solid wedge.



Fig. 2433—150-pound Bronze Regrinding Swing Check Valve with flanged ends and bolted flanged cap.



Fig. 3003 W. E.—Class 300-pound Cast Steel Gate Valve with welding ends, botted flanged yoke, outside screw rising stem and tapered solid wedge.



Fig.1366-A-Class 1500-pound, small size, Steel "Y" Check Valve, Pressure Seal construction. This type of valve also available in angle pattern.



Fig. 11331 W.E.—Class 1500-pound small size Cast Steel Pressure Seal Globs Valve with welding ends. This design permits practically unobstructed flow through the valve body, thus reducing pressure drop and turbulence to the minimum.



Fig. 1331-A — Class 1500pound Steel Integral Bonnet Offset Globe Valve with welding ends. Also available in "Y" and Angle patterns.

*The Complete Powell Line includes Globe, Angle, "Y", Gate, Check, Non-return, Relief and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-resistant metals and alloys.

Ask your nearest Distributor-or write direct

The Wm. Powell Co., Cincinnati 22, Ohio DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

NEW EQUIPMENT for Southern Industry

Steel Union

H-1

The Well Equipment
Manufacturing Corp., 2023
Semmes Street, Houston,
Texas, announce their 3,000 lb nonshock cold working pressure WECO
"Junior" all-steel union in sizes
1/8-in. through 2-in.



Features are: a leak-proof seal obtained by the Weco ball and cone seat; faster assembly and disassembly through Acme threads; and use of a resilient gasket which acts as a supplementary seal and protects the metal-to-metal seat against abrasion and corrosion from line fluids and gases.

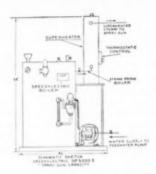
Unions are packaged in corrugated board cartons of 12 and 24, depending on size. This means added protection and simplifies inventorying. Unions are available in black (machine) or Wecolyte cadmium plated finishes.

Steam-Spray Painting

H-2 ING COMPANY, 100 Grove Street, Worcester 5, Mass., announces the Speedylectric SP500, an all electric steam power plant, including an electric superheater with thermostatic control and boiler feed pump, motor and controls.

Unit is designed for the new steam-spray painting processes. Using steam instead of compressed air, tests by one leading manufacturer of paints, chemicals, and lacquers indicate one pass application for 2 mils of film, increased efficiency and lower finishing costs. Labor is saved, paint is saved through less overspray, and thinner is saved through the less reduction required for spraying.

The Speedylectric boiler is available for such applications in a range of capacities from I to 10 spray guns or larger. Unit operates on 220, 440, 550 volts a-c current single or polyphase.



Free additional information is available to readers of Southern Power & Industry. Check item code number on the postage free service coupon post card provided on p. 17.

Diatomite Filters

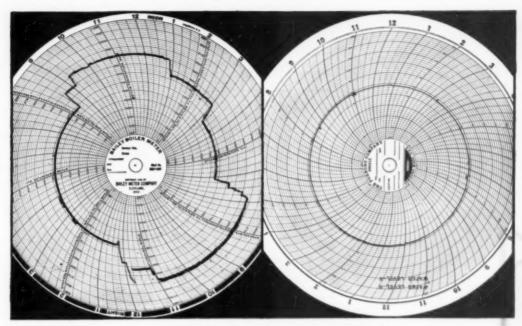
H-3

PORATION, Angola, New York, announce that the Enzinger diatomite filter widely used in the process, chemical, food and beverage industries, has been adapted to filtering boiler feedwater and condensate by incorporating a sluicing device which eliminates opening of the filter at any time. It is built in accordance with A.S.M.E. code from mild steel, stainless steel, or Monel.

Filter features forged stainless steel bolts with Acme threads for holding down the cover, which is mounted on a vertical hinge incorporating anti-friction bearings. A mechanical toggle and lever design is used to raise the filter cover off its gasket seat without effort. Newly designed link type spacer bar for the leaves, permits quick inspection and exchange of leaves at any time.

Uniform cake thickness and complete utilization of the filtering area are obtained by feeding the unfiltered liquids through a baffle to the top as well as the bottom portions of the leaves. Unit is available in sizes from 24 to 560 sq ft filtering area.





Left: Steam flow from B & W Type FH Belier rated at 275,000 pounds per hour, 900 psi, 910 F. Right: Drumlevel held within $\pm \%$ inch by COPES Flowmatic

The most important boiler plant in the world is yours

You hear a lot about one plant or another being important. But no other plant in the world is as important to you as the one for which you are responsible. All any other plant means to you is a chance to learn how to better your own.

Take the boiler from which the charts above were obtained. That it is one of the largest Babcock & Wilcox Integral Furnace Boilers ever built concerns you only because operating experience with it can help you with your own operation.

Study the charts carefully. How do your loads compare? Do you have such sudden sharp changes in rating? Is your drum level held as closely despite the changes? It can be —if your boilers, like this one, are equipped with COPES Flowmatic feed water control. And simple routine care by plant personnel takes care of all maintenance.

Write for Performance Report 487 on this public utility plant. It might help you better the world's most important plant—your own.

NORTHERN EQUIPMENT CO.

703 Grove Drive, Erie, Pa.

BRANCH PLANTS: Canada, England, France, Austria, Italy. Representatives Everywhere



Air-Meter

H-4 Inc., Hampton, Va., announces an electrical anemometer which is claimed to be free of the effects of rate of change of temperature.



The Hastings Model G Air-Meter provides instantaneous, direct readings of air velocities from 5 to 6,000 fpm with an expanded scale in the low velocity ranges, and is now available with built-in temperature compensation to prevent momentary error in velocity reading when

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

the probe is subjected to sudden changes of temperature. The instrument is applicable to the air conditioning industry, in process control, and in research installations in which it is desired to obtain readings quickly.

Wire Brush

H-5

Ave., Chicago 30, III., has announced the production of Skil Flex wire brush designed with wires completely locked in a solid rubber core to reduce danger of flying bristles by eliminating the rigid hinge point on which wires fray and break. According to the manufacturer this resilient rubber mounting allows brush to be used right down to core—individual wires are always in an upright position.

keeping the maximum number of cutting points in contact with the work.

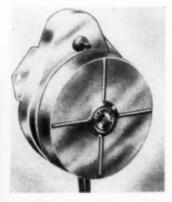


The brushes are applicable for practically all standard portable or stationary shop equipment in power brushing operations, such as removing scale, rust, carbon paint, weld spatter, grease, and surface imperfections from castings, metal parts, and fittings. Brushes are available in 4, 6, 7, and 8-in. diameters.

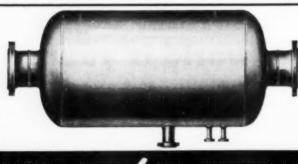
Hermetically Sealed Timers

H-6

The A. W. HAYDON
COMPANY, Waterbury,
Conn., is manufacturing
timers with hermetically sealed enclosures, suitable to applications involving corrosive atmospheres or
high humidity. Hermetic sealing
gives maximum protection against
fungus growth, salt spray, humidity,
oil spray, sand and dust, explosive
atmospheres, and climatic changes.



All enclosures are evacuated to 100 microns and filled to one atmosphere with dry nitrogen so that full switch ratings can be used even at extremely high altitudes where contact capacity is normally reduced. Deterioration of motor brushes is said to be completely eliminated.



Cochrane STEAM PURIFIER

HIGHLY EFFICIENT IN LOW PRES

SURE SERVICE FOR REMOVING

WATER AND OIL FROM EXHAUST

IMPROVES EFFICIENCY AND

REDUCES STEAM CONSUMPTION OF PRIME MOVERS

OF RECIPROCATING UNITS

ELIMINATES PRACTICALLY ALL MOISTURE AND SOLID IMPURI TIES FROM STEAM

PROTECTS AND INCREASES EFFI CIENCY OF SUPERHEATERS, TUR BINES, ENGINES, PUMPS, ETC.

MAKES POSSIBLE DRIVING BOIL ERS AT HIGHER RATINGS

Write for Publication 2725
COCHRANE CORP., 17th St. & Allegheny Ave., PHILADELPHIA 32, PA

98



The illustration above shows P.P.&E. high pressure, high temperature piping being tested by means of a Reflectoscope which produces pulses of vibration waves of a frequency above hearing and transmits them at an angle into the metal through a searching unit which contains a sensitive quartz crystal.

The slightest discontinuity in the metal interrupts transmission of the waves, reflecting them back to the searching unit where the crystal converts mechanical vibrations into electrical energy. This voltage, amplified in the receiver, produces a visual indication of the defect on the screen of a cathode ray tube.

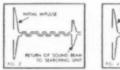
This unique testing method can detect flaws that can be found by no other non-destructive test. Its use assures quality control of materials and welding.

Look to Pittsburgh Piping and Equipment Company for leadership in methods that assure greatest safety, highest efficiency, and longest service from high temperature, high pressure piping.

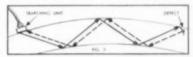


How the "Ultrasonic" Eye Works









Intermittent ultrasonic vibrations are transmitted angularly-into the section under inspection, so that each sound beam is reflected away from its point of origin progressively from inner to outer pipe wall surface in a consistent pattern, as shown in Fig. 1, until it circles the pipe and returns to the searching unit. The uninterrupted flow and return of the beam is indicated on the oscilloscope screen as diagrammed in Fig. 2. Any discontinuity in the metal lying in the path of the sound beam will interrupt transmission as shown in Fig. 3, reflect the sound back to the searching unit, and provide a visual indication of its presence and location on the oscilloscope screen (see Fig. 4).

Socket Wrench Set

H-7

SNAP-ON TOOLS CORPORATION, Kenosha, Wis., announces a new ½" square
drive socket wrench set with every
unit redesigned to improve efficiency
and appearance. Known as the



"Master Supreme Set", it consists of 15 double hexagon sockets ranging in size from 7/16" to 11/4", a 10" ratchet, 18" nut spinner, 15" sliding bar, 18/4" speeder, universal joint, and 31/2", 5", and 10" extension bars.

Terminal Blocks

H-8

BUCHANAN ELECTRICAL
PRODUCTS CORPORATION, 1290
Central Ave., Hillside, N.
J., announces a new solderless type
"Bepco" molded terminal block that
eliminates the need for wrapping

wires around studs or applying terminals to wire ends.



The blocks are provided with compression type solderless units, each capable of receiving wires from No. 16 to 6 AWG. Attachment of wires to block is accomplished by tightening screws after insertion of stripped wires. The blocks are rated at 35 amperes—600 volts, and are available in 4, 8, and 12 circuit sizes.

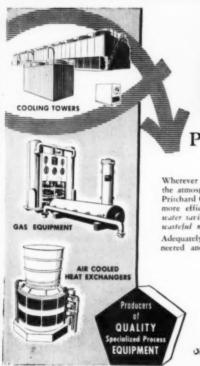
Belted Generator

H-9

Good South Michigan Ave.,
Chicago 5, Ill., announce a
new low priced generator that can
be belted to any available power
unit or tractor whenever power is
needed in case of high line difficulties or failures, or for service in
remote areas.

These generators are furnished in 3 kw and 5 kw sizes. They are of the four pole, self-excited type designed for operation at 1800 rpm, 60 cycle, 120 volts. Type HF synthetic enameled wire is used in the winding of both the armature and field coils, and the wires are further impregnated with insulating varnish, oven-baked. All windings are covered with Glyptal to make them moisture-proof. Ventilation openings are screened. The frame of the generator is of drip-proof construction.







Pritchard INDUSTRIAL COOLING TOWERS Help You Save Water!

Wherever heat is to be dissipated to the atmosphere, you can depend on a Pritchard Cooling Tower to do the job more efficiently and economically at unter savings up to 99% over former unsteful methods!

Adequately sized, thoroughly engineered and manufactured of highest

quality materials, Pritchard Towers are guaranteed to meet your peak as well as your normal load requirements. Wherever you see a Pritchard Cooling Tower, you see water conservation at work.

Consult your nearby Pritchard representative for the solution to your water conservation problem.

Write for FREE Bulletins

Prichard & Co.

Dept. No. 22 908 Grand Ave., Kansas City 6, Mo.

Oistrict Offices: Chicago • Houston • New York • Pittsburgh • Tulsa • St. Lovi-Other Representatives in Principal Cities from Coast to Coast



IDENTIFICATION DISC: An aluminum marking plate on all Walworth No. 225P's facilitates inventory control and makes reordering quick and positive.



NEWLY DESIGNED HANDWHEEL: Patented air-cooled, finger-fit handwheel affords sure erip even with greasy gloves.



take a good look at the Walworth "500 Brinell" no. 225P Globe

- the Toughest Bronze Valve Your Money Can Buy

The stainless steel, corrosion resistant seats and discs are heat treated to a hardness of 500 Brinel! — hard enough to scratch glass and crush nails! The valve can be closed on sand, slag, and pipe scale without injury to the seating surfaces. "Wire drawing" is practically eliminated. All parts are accurately machined and gaged. Years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 277P) in sizes 1/4" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas, or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular.



IMPROVED PACKING: Molded packing of lubricated asbestas reinforced with capper wire. Suitable far practically every service. Valves can be repacked under pressure when fully apened.

note these 7 Great Features



HEXAGONAL UNION BONNET CONNECTION, DEEP STUFFING BOX AND RUGGED STUFFING NUT: Union bonnet connection

eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and reassembled.





SEATS AND DISCS: Plug type seats and discs of stainless steel, heat-treated to 500 Brinell hardness and machined simultaneously to a mirrar-like finish, with accurate topers assures light positive shut-off with minimum handwheel effort.



EXTRA STRONG BODY: Made of Camposition M (ASTM B61) bronze. Thick walls and rugged hears provide a high safety factor. Valves undergo hydrostatic shell test of 1,000 psi. WALWORTH valves and fittings

40 EAST 42nd STREET, NEW YORK 17, N. T.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



BETTER SEALING...LONGER LIFE

 Idle equipment affects production schedules...influences product quality and many times cuts deeply into profits.

To keep equipment producing, use Belmont, the Packings that have individual characteristics and are scientifically designed and constructed by packing specialists to seal better and last longer.

Easy to get...Belmont Packings are stocked by local distributors in every large industrial center. Or, if you have a problem that requires special engineering attention, write direct.

Catalog #40 is available, write for it.

THERE'S A BELMONT PACKING FOR EVERY SERVICE



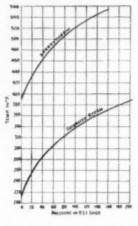


Rings - Spirals - Coils - Reels Speels - Sheets - Gaskets

Electrode Boilers

H-10

Company, 100 Grove St., Worcester 5, Mass., has added to its line of electrode boilers their latest development in low pressure high temperature process heating, known as Speedytherm. Similar in design and operating characteristics to Speedylectric boilers with automatic balanced control, the Speedytherm boiler utilizes the electrode principle but instead of using water to produce steam, Speedytherm liquid is substituted.



This material, according to the manufacturer, has been developed by the company's engineers in cooperation with a leading manufacturer of chemicals. In the boiler it functions like water except that its boiling point is much higher and its "steam" or vapor temperature, at any given pressure, is far above that of saturated steam. Speedytherm vapor can be delivered and circulated through ordinary piping. It is a suitable heating medium for platens. molds, jacketed kettles, and autoclaves, where working pressures must be limited and where desired temperatures are in the range of 400 F to 550 F.

H-11 Phillipsburg, N. J., has introduced a new line of gasengine-driven compressors, available in 110, 165, and 220 hp sizes. These machines consist of 4, 6, and 8 power cylinders respectively, having an 814" bore and a 9" stroke and

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

have 2 power cylinders for each compressor frame,

The unit is a small, compact compressor of the 4 cycle, V-angle design, having the power connecting rods articulated with the compressor rods. It is light enough to meet requirements for semi-portable use in the field, yet incorporates features found in permanent installations.





- and the second second
- Mechanical Atomizing Oil Burners
 Steam Atomizing Oil Burners
- Refractory Surner and Muffle Blacks
- · Industrial Gas Burners
- . Low Air Pressure Oil Burners
- * Fuel Oil Pump Sets
- Valves, Strainers, Furnace Windows
- Tandem Black Combustion Units
 Combination Gas and Oil Burners

Detailed information gladly sent you upon request.



ARUL

BURNER COMPANY INC.

1279 East Sedgley Avenue, Philadelphia 34, Pa. Southwestern Division: 2512 South Boulevard, Houston 6, Texas

Refrigerant Gas Condenser

H-12 405 Lexington Ave., New York 17, N. Y., has announced a new Aeropass refrigerant gas condenser. Designated as the 5800 series, the new condenser is de-



signed especially for use where Freon is the refrigerant and for air conditioning and industrial refrigerating applications. The series consists of five standard units ranging in capacity from 10 to 50 tons refrigeration at 105 F Freon condensing temperature and 74 F atmospheric wet bulb temperature. The smallest unit has casing dimensions of 31" x 24" x 8514" in height and the largest is 94" x 30" x 9314" in height. Casing, fan, and eliminator construction is galvanized steel. Condensing coils for Freon are copper tube, with copper fin or hot galvanized steel tube and fin.

Power Saws

H-13

DE WALT INC., Lancaster,
Pa., has added to its line
of radial arm power saws
one model with new steel cabinet,



and one model ready for portable use. Model GS has the basic unit mounted on a light but firm pressed steel cabinet. Entire unit weighs 115 lb. This light-weight feature coupled with a new recessed cabinet top design permits easy removal of saw unit, table and table base from the cabinet itself, thereby allowing for use of machine as a portable power saw. The cabinet can be equipped with shelves and drawers for storing tools.

Model GS DeWalt is equipped with a ½ hp motor, can cut 2" thick material, cross-cut 12" wide, and rip to the center of a 43" panel. This new model is as versatile in application as the larger machines.

Tank Magnet

H-14 is offering a low-cost permanent magnet device for removing ferrous parts and contamination from electroplating tanks, alkali baths, acid baths, etc.

Made of stainless steel, the tank magnet is temperature-proof, acid



and alkali-proof. It is operated very much like a carpet sweeper, with the magnetic tube mounted between neoprene wheels. Ferrous material moves to the magnet and spreads itself over the entire circumference to a thickness of about ¾. Unloading is accomplished at either end by simply pushing the upper ring from one end of the tube to the other, where a non-magnetic section causes the load to be released.

Prices of Eriez tank magnets are \$35.50 for the smaller size and \$41.50 for the larger.



SLEED-INGE (Asilenia Sheen) - 250-21-550 (desien) - WEGS

ALBANY INDUSTRIAL SPECIALTIES



ALBANY LUBRICANTS

Albany Grease
Pressure Greases
Graphite Greases
Ball & Roller Bearing Greases
Gear Lubricants
Rope Dressing
Penetrating Oils
Automotive Lubricants

METAL WORKING

Cutting Oils
Grinding Compounds
Cutting Compounds
Grinding Oils
Soluble Oils
Forging Compounds
Tempering Oils
Rust Preventives
Quenching Oils
Spinning Lubricants
Die Lubricants
Honing Compounds

ELECTRICAL DIVISION

Albany RBR Wire Pulling Compound Paraffined Cheesecloth Rolls Stearine Candles & Flux

Send for Recommendation Charts

Southern Representatives:
McCARTHY & CO., 1312 Poinsette Ave.,
Orlando, Fla.

J. H. MENGE SALES CO., 309 International Trade Mart, New Orleans, La.

1868-1950 BUT MORE MODERN THAN EVER

ADAM COOKS SONS.

Mirs of Albany Lutricating Produ



Level Indicators

PANALARM PRODUCTS INC., 7218 N. Clark St., Chicago, H-15 Ill., is now producing level indicators with illuminated dials. The new development, known as the "Panellit" pneumatic indicating receiver, incorporates new design features. The manufacturer states that an exceptionally sensitive response to changes in levels in tanks, towers or vessels, or changes in valve position corresponding to variations in impulse pressures from any 3 - 15 lb transmitter, from any remote point, is visually simulated on graduated dial. A solid red band on this translucent scale dynamically depicts every dip and rise in levels

Receivers can be equipped with positive high and low alarm mercury switches, adjustable over the entire range. These may be supplied to operate a standard signalling unit, mounted in the gage. The function of this alarm device is to light up a bull's eye signal lamp and simultaneously sound a warning horn whenever indications exceed the high or low settings. By means of an acknowledging pushbutton the horn may be silenced while the red warning light remains until conditions are restored to normal.

Speed Reducer

WINFIELD H. SMITH CORPORATION, Springville, N.
Y., is producing a new
double reduction speed reducer to
serve fractional horsepower and
small space requirements. Designed
as Type DBRA, this latest addition
to the Winsmith line is designed for
many duties in the transmission of
small power loads, and is stocked in
24 different right angle drive assemblies.

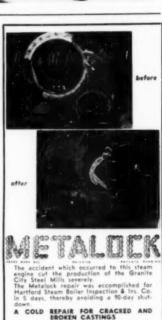
The unit offers a range of 1/20-18 hp, and reduction ratios of 25:1 to 1764:1. This range of speed and power is said to eliminate the neces-

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

sity for many users to employ bulky speed reducers that include horsepower ratings 50 - 100 times greater than required. Its versatility affords numerous applications in industrial





for Information and Service

METALOCK CASTING REPAIR SERVICE

SOUTHERN DISTRICT
1213 CONGRESS BLDG., MIAMI, PLA.
Phones 82-2837 and 3-8588
Hame Office and Plant—Long Island City. N. V.
Branchos in Principal Cities

Inert-Gas Rectifier

WESTINGHOUSE ELECTRIC
CORPORATION, 306 Fourth
Ave., Pittsburgh 30, Pa., is
producing a new grid-controlled, inert-gas rectifier known as type
WL-5796 thyratron at the Westinghouse Lamp Division in Bloomfield,
N. J. A three-electrode, temperature-free tube, the WL-5796, is designed for industrial control and
ignitor firing service.



Maximum peak voltage, both inverse and forward, is 1500. For general control service, maximum cathode current is 20 amps peak, 1.6 amps average. In ignitor firing applications, the tube's maximum cathode current peak is 30 amps, and the average 0.5 amps. For both types of applications, the maximum negative control grid voltage before conduction is 250; after conduction 10. The maximum commutation factor rating is 10. The tube can, therefore, be used in polyphase rectifiers on inductive loads with very small or no cushioning circuits. The cathode voltage is 2.5 and the cathode heating time is 10 seconds.

The tube utilizes air convection cooling and can be operated in any position. It has a net weight of 3 curves.

Magnets

H-18 has introduced a new group of non-electric plate magnets for separation of tramp iron from materials in process. Known as "Atomagnets", they come in three models, each with a different magnetic strength, and also in a full range of sizes.



New features of the magnets are: the magnet castings are now fully encased with a formed cover; parts are riveted together for added structural strength; hinges on standard models are made of aluminum, continuous and offset; insulation of the plate's working surface confines magnetic strength to where it is desired; a flush instead of recessed air gap on the plate face prevents gathering of fine iron where it could short out the magnetic field.

The magnets can be used in the food, milling, chemical, metalworking, textile, ceramic, rubber, paper, mining, tobacco, and many other industries to separate stray iron from materials in process.



Service in Step with Southern Progress

WAREHOUSE DIVISION

Atlantic Steel Company

ATLANTA, GEORGIA . EMERSON 3441

Check Your Paint-Stripping Problem HERE

- ☐ How can we strip baked-on primer coats without resorting to expensive thinners and solvents?
- Do you have a good idea that'll speed up the removal of toluene-thinned, asphaltbased paints from underground transformers?
- We've had a slew of armature coils in the shop for months, waiting for an economical way to strip insulating varnish... what do you have?
- Other headaches.

NAME.....

COMPANY.....

Power plant paint-stripping can be done easily and quickly if the proper stripping compound is selected-then applied as recommended. Take transformer stripping, for example. Your nearby Oakite Technical Service Representative can show you a number of jobproved methods, including hot flow-on, cold spray, steam-gun and tank-immersion techniques. He'll help you select the Oakite method best suited to your lay-out ... help you find a simple way to save time and money on the job.

Let us have your paint-stripping problems (whatever they might be). We'll ask the Oakite Technical Service Representative in your vicinity to visit your plant and talk them over with you. Or, if you'd like to have some factual data about fast Oakite paint-stripping procedures first, send for a complimentary copy of the Oakite Power Plant Digestof71 maintenance-cleaning procedures. Oakite Products, Inc., 23 Thames St., New York 6, N. Y.



Technical Service Representatives Located in Principal Cities of United States and Canada

Industrial Oiler

H-19 LINCOLN ENGINEERING COM-PANY, 5701 Natural Bridge Ave., St. Louis, Mo., announces the manufacture of a new master oiler for industrial lubrication.

The new oiler, known as the Centr-Oiler, may be installed in any machine tool to lubricate a multiplicity of bearing points. No special engineering skill or knowledge is required to make the installation. The new system enables the machine operator to apply the right oil, in the right quantity, at the right time, to every machine bearing point.



The device is designed to reduce oiling time and down-time and the need for expensive replacement parts. It consists of the pump supplying lubricant through a single line circuit of SL-4 injectors which in turn deliver a predetermined, measured quantity of oil to each bearing every time the system is cycled.

The manufacturer claims that the oiler reduces maintenance costs and therefore lowers operating costs. Complete information is available from the manufacturer in Bulletin 802.

Wattmeter

H-20

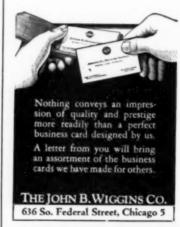
General Electric Company, Schenectady 5, N. Y., has announced a new hook-on wattmeter applicable to active and reactive power measurements in single and polyphase circuits.

Designated as Type AK-2, the new device enables measurements to be taken without service interruption. It makes use of a removable magnetic hook to surround the current carrying conductor, and potential leads are connected as in a conventional single-phase wattmeter. In addition, a three phase



balanced power measurement is made possible by the hook-on unit. This is accomplished by passing two power leads through the hook, and connecting the potential leads to these same two power leads.

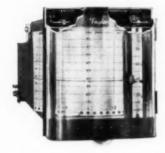
The instrument is designed to meet exacting requirements as to accuracy, weight, simplicity of operation, and range of full scale capacities. Through the use of a single dial switch, a selection of any one of six power measurement ranges is available to provide readings from 3 to 300 kw full scale deflection.





Receiving Recorder

H-21
PANY, 95 Ames St., Rochester 1, N. Y., has announced the "Transet" recorder, a new miniature recording-receiving instrument for pneumatic transmission of flow, liquid level, pressure, and temperature.



The instrument is a compact unit suited for either graphic or conventional panels. It fits into a panel opening of 3%" x 4½" with a flange measurement of 4%" x 5". The door is made of clear plastic to give full

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

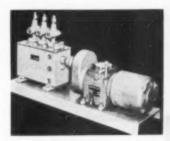
view of the chart, scale, and all principal instrument settings. When door is opened, adjustments can be made for instant checking of the valve position and for automaticmanual service.

The equipment records the transmitter output in terms of the process variable measured. Detailed information is available in Bulletin 98079

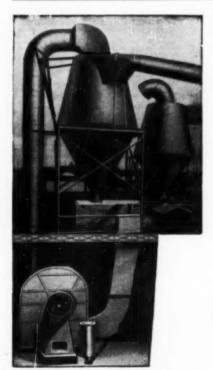
Chemical Feeder

MANZEL DIVISION OF FRON-TIER INDUSTRIES INC., Buffalo, N. Y., manufacturers of force feed lubrication and chemical feeding equipment, announces a new chemical feeder of large capacity. Capable of pumping against pressures of 300 lb per feed, it is adjustable up to one gallon of liquid per minute per feed.

Multiple units may be supplied with any number of feeds, operated by rotary, motor, or lever drive. Pumping units may be constructed of various materials to meet special requirements in food, chemical, petroleum, and other industries.



The new equipment is similar in operation to the other Manzel Chemical Feeders, automatically injecting the chemical in exact proportion to the amount of liquid being pumped, only the pumping unit comes into contact with the chemical, as the entire driving mechanism operates in a tightly enclosed oil filled case.



"Necessary Nuisance" MADE UNNECESSARY

. with Liberty Dust Control System!

Fine dust, accepted for years as a necessary nuisance, has been completely eliminated at The General Plywood Corporation, Louisville, Kentucky. The cyclones above the roof received fine dust or wood flour. The finest part of this dust was discharged by the cyclones. Local courts ruled this a necessary nuisance.

Then Liberty introduced "engineered cleanliness". A "Roto-Clone" installed inside the building eliminated all traces of dust, another example of the right installation in the right place. Liberty Engineers plan, design and install complete dust collecting systems guaranteed to give you the results you want. For information on a complete dust collection system or expansion and modernization of your present system, write us today.



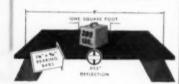
ENGINEERING & MANUFACTURING CO.

1454 South 15th St., Louisville 1, Ky. A Division of The Kirk & Blum Mfg. Co.



For STRENGTH specify TRI-LOK

OPEN STEEL FLOORING



The locked-in strength of Tri-Lok enalbes it to stand up under heavy loads even on long spans. No rivets, bolts, or welds are used in the construction of Tri-Lok; this feature eliminates the possibility of loose joints.

Tri-Lok is also available in Diagonal, or Super-Safety U-type Flooring, and in Stair Treads of all types. Write for Bulletin KN 1140.

DRAVO CORPORATION

National Distributor for the Tri-Lok Company

Drave Bidg., Pittsburgh 22, Pe.

Sales Representatives in Principal Cities



CATALOGS AND BULLETINS

(Continued from page 18)

B-10 FURNACE INSTALLATIONS—Catanace and holier settings in Southern industrial plants. Installations designed to convert waste materials into low-cost steam 7-page section on Acme designed arches and supporting walls.—ARCO FLRNACE DIVISION, ACME BRICK COMPANY, Fort Worth 2, Texas.

B-11 PNEUMATIC TOOLS—Catalog 47, 24 pages—Describes Cleeo pusumatic tools for industry—heavy grinders, and ers, buffers, rotary file and burr machines, drills, reamers, screedivers, impart werehes, etc.—CLECO DIVISION, REED ROLLER BIT COMPANY, Box 2119, Houston, Texas.

B-12 DIESEL ENGINE—Hulletin 172 s Nordberg radial engine of the type used in Aluminum Co. of America's Point Comfort Works, Design features and operational data are included.—NORDBERG MPG. CO. Milwatker 7, Wis.

B-13 DUST COLLECTOR—Brochure, 16 pages— Type 'S' Dust Collector is described and illustrated with plant photographs and diagrams. Table of specific matter and the statement of the statement of

B-14 PNEUMATIC CONVEYORS—Bulle tin A-15, 24 pages—"Airveyor" in stallations are illustrated and described by means of typical case histories in specific industrial plants, with applicational photographs and diagrams—FULLER COMPANY, Catasauqua, Fa.

B-15 WELDING FITTINGS Catalog 48
B-15 Data on welding fittings and a 65page technical reference section for engineers of welded piping systems. Includes
charts, tables, graphs, condensations and
discussion of pipe specifications, welding
data, design formulas, metallurgical informatine. Has complete pictorial index of company's line—MIDWEST PIPING & SUPPLY CO., INC., St., Louis, Mo.

B-16 UNIONS AND PARTS—Catalog 50
ers, thread compounds, valve handles, lubricators, fusible boiler plugs, steam gauge procators, fusible boiler plugs, steam gauge protectors, warehouse and derrick stoves, unions
and parts are catalogued and illustrated.
Price list included.—WELL EQUIPMENT
MFG, CORP., 2023 Semmes 81, Houston,
Texas.

B-17 FILTERS—Bulletin, 6 pages—Filters
built to specifications for process,
chemical, food and beverage industries are
illustrated and described. Slurry feeder, filter leaf, cleaning of filter leaves, shicing
device, individual leaf outlet, pilot plant
unit, and operation are discussed—EXZIN,
GER UNION CORPORATION, Angola, N. Y.

B-18 CABLE REELER—Booklet, 5 pages tion and its cable coller accessory are described and illustrated with applicational photographs. Construction and uses are explained—TOM NILAND EQUIPMENT CO. 19 North Hutcheson, Houston I. Texas.

B-19 FLY ASH COLLECTION—Bulletin veying dry fly ash and collecting fly ash and flue dust are illustrated and described by means of specific plant applications. Design and operation are explained.—FULLER COMPANY, Catassunqua, Pa.

B-20 PARTS INSPECTION—Rulletin, 4 to pages—Complete automatic inspection of parts on the production line by means of Magnaflux Duovee inspection is discussed New unit is illustrated and applications are suggested.—MAGNAFLUX—CORPORATION, 5004 Northwest Highway, Chicago 31, Ill.

B-21 STEAMERS — Booklet, 8 pages — Self contained, completely automatic units for packaged portable steam -npplies are described with recommended services and applicational photographs. Dagram shows piping arrangement — BETTIS CORPORATION, 1507 Many Sr. Huston Texas.

B-22 EMBRITTLEMENT ONTROL
how to distinguish between steam boiler cracks caused by corrosion-fatigue and embrittlement; explains prevailing conditions that cause intercrystalline cracking of boiler metal; explains recent developments in control.—ALLIS-CHALJERS MFG. CO., 954 S. 70th St., Milwaukee, Wis.

B-23 MATERIALS HANDLING — Catalog RF. 40 pages—Describes the sectional truss, a tool for materials handling. Belt and accessories are catalogued, and layout sheets are included for planning conveying — BARBER-GREENE COMPANY, Autoros. III.

B-24 ELECTRICAL DISTRIBUTION

seribes and illustrates the "Nepcoduct" steel
underfloor electrical raceway system for
either new construction or modernization
brawings, specifications, and photographs of
component parts are all the property of the propert

B-25 AIR AND HYDRAULIC POWER phication of air and hydraulic power and shows circuit diagrams indicating how air and hydraulics may be efficiently applied to industrial equipment.—RIVETT LATHE & GIRINDER, INC. Brighton 35, Boston.

B-26 BLOWERS—Bulletin No. 83, 3 pages—Dimensional data on the Standardaire blower includes engineering layout, typical applications: design features; blower number; rating—cfm at blood rpm—THE STANDARD STOKER COM-PANI, INC., 370 Lexington Ave., New York 17, N. Y.

B-27 FLOW METERS—Data Book No. 702, 32 pages—Hillustrates and explains flow measurement problems and their solution. Meter bodies, differential devices and reading instruments are described and a section is included on wide range and reverse flow—REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago 47, Ill.

B-28 STORAGE METHODS—Folder No. 220, 6 pages—Equipment and accessories for compact storage are illustrated and described. Of particular interest to those responsible for parts and stock storage in manufacturing processes as well as tool critis and shipping rooms—FRICK GALLAGHER MANUFACTERING COMPANY, 401 Shubert Bidg., Fhiladelphia 2, Pa

B-29 LUBRICATION—Booklet. 16 pages costs. Are explained in pocket sized booklet on industrial lubrication prepared especially for use by maintenance men Simplified in brication methods are discussed. Specific exSTEW ALT WAYS E. CONFOLKTION, 1826. Diversey Parkway, Chicago 14.

B-30 WATER TANKS—Pamphlet, 8 pages lined elevated water tank to provide gravity water pressure for general service and fire-protection is described and illustrated. Contains illustrations of typical installations from 25.00 to 150.00 gallons capacity—CHICAGO BRIGHER, & RON COMPANY, 322 South Michigan Ave., Chiegge 4, Ill.

B-31 STEEL PIPE—Data Card TDC 135 dred feet of scamless carbon steel pipe 1½ in. in neminal diameter and smaller, in all quantity brackets—BABCOCK & WILCOX TUBE CO. Beaver Falls, Pa.

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

FROM STEEL PLATE ..

TO FINAL ERECTION -



Illustrated is a 100,000 gallon water storage tank. typical of equipment which Finnigan is prepared to handle for you from raw material, through fabrication, to erection on your site.

For more than 60 years a leading supplier of steel tanks and pressure vessels, boilers, smokestacks and breechings to Southern industry, Finnigan combines ability and skill to produce long-life equipment to your exact specifications. Over the years, comparison has brought us our best customers.

A letter or wire will bring a qualified representative to discuss your problems with you.

J. J. FINNIGAN CO.

455 MEANS ST., N. W. ATLANTA CEORGIA

ALUMINUM . COPPER . STAINLESS STEEL . STAINLESS CLAD TANKS STEEL SMOKESTACKS . SMOKE BREECHINGS . AIR COMPRESSOR TANKS

Making Shapes from Buller Plate Since Lightnen floodred and Lighty-Light .

To Operators of H.R.T. Boilers



As you know, riveted circumferential seams are subject to fire-cracking, which causes leaks and expensive repairs. National Seam Protectors insulate the seams from flame, preventing damage. Used for 34 years on thousands of seams. Recommended by inspectors. Write for complete information.

> (Opportunities for Contractors and Distributors)

NATIONAL BOILER PROTECTOR CO.

928 REIBOLD BUILDING

DAYTON 2. OHIO

NOW! All Overhead Valves are Instantly Accessible



with the LOW-COST

SPROCKET RIM with Chain Guide

Range of 10 adjustable sizes takes care of all valve makes and types; fits valve wheel diameters from 2 to 30 inches.

Overhead valves—no matter how high, or in whatever hard-to-get-at location—are instantly accessible from the floor. Operation is quick, easy, positive and safe with the BABBITT Adjustable Sprocket Rim with Chain Guide. No more climbing on bench, machine, boiler or treacherous stepladder; no time-

BABBITT Rim fits all valves, with either rising or not rising stems. It is installed quickly by clamping onto the hand wheel of the valve.

Write today for Catalog Bulletin SP and surpris-ingly low prices, Jenkins Brothers, Atlanta, has com-plete stock. Other distributors in principal cities.

BABBITT STEAM SPECIALTY CO. 3 Babbitt Square, New Bedfard, Massachusetts, U. S. A.

Want More Accurate



POWERS new type 190 Hygrostat may be your answer. It is pneumatically operated, sensitive to the slightest changes in relative humidity. Users state "it is the most accurate hygrostat made.

Control

Controls valves or dampers in connection with heating or cooling coils, humidifiers, air washers, humidifying atomizers, spray nozzles, etc.

Used in processing and storage rooms in textile mills, industrial plants, laboratories, printing plants, telephone exchanges,

and comfort air conditioning systems in all types of buildings. Easy to install. Room and duct type instruments. Test one. You'll buy more to replace obsolete, inaccurate controls. Get Bulletin 302 for complete details.

THE POWERS REGULATOR CO., 2775 Greenview Ave., CHICAGO 14, ILL. • NEW YORK • LOS ANGELES.

OFFICES IN 50 CITIES &

ERATURE and HUMIDITY

CLASSIFIED ADS

BUSINESS-EMPLOYMENT-EQUIPMENT-PROFESSIONAL CARDS-OPPORTUNITIES

RATES DISPLAYED

"For Sale," Agents Wanted, and all other advertisements ag bold face type or otherwise displayed, \$6.00 per column h per insertion. Rates for larger spaces furnished on application

WITHOUT DISPLAY

"Position Wanted" advertisements, 5 cents per word per insertion, Minimum charge \$1.00, Payable in advance. (When replies are to be received in our care allow eight words for the box address.)

FOR SALE CHEAP

Skinner Uniflow G. E. Generator Set K. V. A Old model, but had very little service. Passe light fire and needs rewinding. Engine and bear-ing in perfect shape. Must have the room. Will load F.O.B. cars, Atlanta, Gs. @ \$1250 6 THE WARREN CO. INC., 905 Memorial Drive S. M. Atlant. Gs.

ON SOLID FUEL COSTS

Automatically Controlled Labor and Fuel Saving

/R-FEEDER WOOD WASTES AND/OR COAL

MULTIPLE AIR JET PROPULSION

PATENTED MECHANICAL SPREADER STOKERS

FYR-FEEDER automatically measures, feeds and burns Wood (planer) Chips, Sawdust, Chaaper Coal Sizes, Coke Breeze, Hagged Wood and other Solid Fuels and makes very large savings!

FYR-FEEDER is the World's most officient Solid Feel &

FYR-FEEDER PAYS FOR ITSELF OUT of SAVINGS QUICKLY

READ THIS EXCEPTIONAL OFFER!

If our engineer's estimate shows that FYR-FEEDER can SAVE you between \$2,000.00 to \$5,000.00 per year, or more, we will ship a FYR-FEEDER to you without any DOWN PAYMENT or investment on your part. You pay us the Sevings FYR-FEEDER makes with IPYR-FEEDER is posit for.

shing offer become use we know wh FYR-FEEDER is accomplishing for hundreds and hundreds

No matter what type of comb now using, learn about the FYR-FEEDER... HOW it PAYS
FOR ITSELF out of fuel savings... and WHY it is replacing

FYR-FEEDER ENGINEERS-Division American Coal Burner Company 18-7 East Erie St., Chicago II, III.

American Coal Burrow Co. 16.1 Sect Sits St., Chicago 11, III.	1000 Veer Sprouder (Coast Frguessing Coat, West Waster, Art Safet Facts for roboth at and Large Heating Bellet
Tall as more about the FTR FEED A- tions will care got for it set of services soldback and bloom became?	the are independent in first first the first state of the first state
Address	
	Fiele

POSITION WANTED

—by operating maintenance engineer: 35 years old, married, with family, 14 years marine and industrial experience in steam production, distribution and use—electric power production, distribution maintenance and use—steam and Diesel power production, distribution, experation and maintenance—theory operation and maintenance—peration and maintenance—operation and maintenance—peration and maintenance—the production of the pro

Desires to locate in Southeast or Far West with reputable firm. Re-ply to Box 159. SOUTHERN POWER & INDUSTRY, 866 Feach-tree St., N. E., Atlanta, Georgia.

POWER ENGINEER

Twenty-five years experience, operation and maintenance of modern power plants, electrical equipments, and water filtration plants. Fiften years high pressure plant, some construction experience. Desire supervisory-engineer position with a utility, industrial plant or municipality. Registered engineer, gold seal licensed power plant operator. Will relocate or travel. Write E. V. Frankhouser, 1317 Spruce Street, Philadelphia 7, Pa.

MANUFACTURERS' REPRESENTATIVE

Covering New Mexico, Arizona, Colorado, and Texas, desires additional industrial lines for all or part of mentioned territory. Member of the Diesel Engineers International Association; and Instrument Society of America, George A. Krutlick, P. O. Box 227, El Paso, Texas.

ASSISTANT PLANT ENGINEER

With at least 3 years' experience in industrial plant maintenance emphasis on electrical maintenance. E.e. or E.E. degree required Gire full details, experience, education, age, salary farts letter. Write Box 100 of SOUTHERN PUWER & INDUSTRY, 806 Peachtres St., N.E., Atlanta S. Ge.

Your Advertisement in This Section

HAVE you some equipment, new or second hand, which you wish to dispose of? Do you desire a good man to fill a vacancy in your plant? Do you desire a position? Do you desire your business or professional card placed before the power, industrial and refrigeration fields?

Why not try an advertisement on this page of SOUTHERN POWER & INDUSTRY with its 15,500 copies per month? SOUTHERN POWER & INDUS-TRY reaches the active executives and managers, superintendents, heads of departments and engineers, —the men directly in charge of plant process, the men who buy or dictate the buying of machinery, equipment and supplies.

Advertising on this page produces results at small cost. Note the rates above and tell us what you wish to advertise.

SOUTHERN POWER & INDUSTRY

806 Peachtree St., N.E. Atlanta 5, Georgia



This compact version of the pioneering Erie City 3-Drum Boiler is designed to meet limited space conditions without usual restrictions in over ratings. The use of 21/2" tubes with their favorable ratio of heating surface to water volume permits rapid circulation and more efficient heat transfer. For complete data on 4 Types write for Bulletin SB-22B.

ERIE CITY IRON WORKS . ERIE, PA. 1401 East Avenue

Complete Steam Generators . Type C 3-Drum Boilers . Type VL 2-Drum Boilers . The "Economic" Boiler with without Water Walls . Welded H.R.T. and Vertical Boilers . Steel Heating Boilers . Pulverizers . Underfeed and Spreader Stokers





Sales Representatives in All Principal Cities.

Steam Jet

Single or Twin Two-stage Tubejets with Surface Inter-After Condenser for vacuum requirements of Power Plant Steam Condensers; also Two-stage Tubejets with Surface After-Condenser for replacing a mechanical wet vacuum pump on existing "Wet Type" Surface Condensers. In addition, for process vacuum requirements, Single to Five-stage Ejectors for maintaining absolute pressures from 3.5 inches of mercury to less than 250 microns. Non-condensing and condensing types, all illustrated and described in Catalog No. 1462. Write for it today.

C. H. WHEELER MFG. CO. 1804 Sadgley Avenue, Philo. 32, Po. KEPRESENTATIVES IN MOST PRINCIPAL CITIES

C.H. Wheeler OF PHILADELPHIA

DOUBLE SAFETYFOR YOUR BOILER BLOW-OFF

with this



The STRAIGHT-THROUGH TYPE on the left gives you wide-open, full-pipeline flow with a quarter turn of the lever. It's designed so that no damaging grit can lodge between the seat and the sealing disc . . . and the more the valve is used, the more the self-lapping action of the disc rotating across the seat *improves* the drop-tight seal.

The ANGLE TYPE on the right is stoutly built to withstand the blow-off shock. It takes the punishment, all right . . . and endures. Abrasives can't hurt this valve, either, because there are no pockets where they can lodge.

Thus, this EVERLASTING Valve team assures practically zero maintenance as well as double safety. Conforms to ASME and other codes . . . made in sizes 1½-in., 2-in. and 2½-in. for pressures up to 600 psig . . . and either valve available separately in cast iron or steel. Write today for full information without obligation.

EVERLASTING VALVE CO.

49 Fisk Street, Jersey City 5, N. J. Trade Mark "EVERLASTING" Reg. U.S. Pat. Off.

EV 3191

Everlasting Valves

for everlasting protection

Index of ADVERTISERS

The Advertiser's Index is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to innert.

A -	E
Adam Cook's Sons, Inc	Eagle-Picher Co
Anaconda Wire & Cable Co 23 Anderson Co., V. D.	E
Armstrong Machine Works	Fairbanks, Morse & Co. 81 Farquhar Co., A. B. * Fedders Quigan Corp. 79 Finnigan, J. J. Co., Inc. 109 Fisher Governor Co. 67 Flexible Steel Lacing Co. * Foster Engineering Co. * Foster Wheeler Corp. *
Babbitt Steam Specialty Co 109	Frick Company
Babcock & Wileox (Boilers) 25 Babcock & Wileox (Refractories)	
Bailey Meter Co.	G
Bay State Abrasive Products Co	Garlock Packing Co
	Н
С	Hagan Corp
Camea Products, Inc	
Carollina Refractories Co	Industrial Electronics Corp., 113 Infileo, Inc. Ingalls Iron Works Co. Ingaroll-Rand Co.
Combustion Engr. Superheater The	Iron Fireman Mfg. Co
Cooper Bessemer Corp. 7 Crane Company 22	Jeffrey Mfg. Co. Jenkins Bros. Third Cover- Johns Manville, Inc. 87 Jones Foundry & Mch. Co.
D	W A
Dart Mfg. Co., E. M	
Diamond Power Specialty Corp. 27	K
Corp. 27 Dowell Inc. Back Cover	Kewanee Boiler Corp113

-completely eliminate annoying blinking and flickering of dead fluorescent lamps!

> GUARANTEED -FOR ONE YEAR!

PROTECTS — Automatic thermal relay cuts out defective lamps, eliminates annoying blinking and protects all auxiliary equipment.

SIMPLIFIES — Replacement of defective lamp automatically recycles starter circuit. No buttons to push — no replacement of

REDUCES COST - Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission mater-ial, thus assuring maximum lamp life.

VERSATILE - Built to operate efficie over an extended voltage and temperature range with absolute dependability.

Demonstration and Literature on Request.



5P-15-20 For use with 15

SP-30-40 For use with 30 or 40 watt lomes.

SP-85-100 For use with Manufactured under

U. S. PATENTS 2239244 2341520

2334935







Jubox & Jubacox

Simplified Anti-Corrosive **Paint Systems**

Self priming and interchangeable, Subax & Subalax lend themselves to simplified and harmonious maintenance paint systems since all varieties have and distinctive basic pigment, chemically active subaxide of lead (Pb₁O).

Subox paints provide maximum protection - are available in a range covering all phases of the electrical industry





LOOSE BOLTS

Bolts with worn threads-undersize bolts in oversize holesbolts passing through thin walls—bolts holding ill-fitting cast flanges—all can be tightened firmly with quick-setting Smooth-On No. I Iron Cement. Use it, too, to lock nuts tight, and to cover and protect countersunk bolt heads in metal or wood. These repairs stay tight because Smooth-On expands slightly as it hardens. Buy Smooth-On No. 1 in 7-oz., 1-lb., 20-lb., or 100-lb. size and keep it handy. If your supply house hasn't Smooth-On, write us.

FREE REPAIR HANDBOOK



40 pages filled with time-saving, moneysaving repairs on plant, shop and home equip-ment made with No. 1 and other Smooth-On Cements. Drop us a line for YOUR free copy.

SMOOTH-ON MFG. CO., Dept. 35 570 Communipaw Ava., Jersey City 4, N. J.

Do it with **S** THE IRON CEMENT OF 1000 USES



INING

USED IN

PLACE OF

FIRE BRICK

LONGE

Degree and

Boiler furnaces lined with CARECO last two to four times longer than those lined with fire brick. Write for quotation.

CAROLINA REFRACTORIES COMPANY MARTSVILLE, S. C.

Nicholson Catalog 250 Describes a

COMPLETE LINE OF TRAPS

for Every Application

Nicholson furnishes traps for all mediums: - weight and piston-operated for heavy duty; metal expansion and thermostatic for medium pressures. CATALOG 250 is a standard reference.





W. O. HICKBLEDN & CO., 175 Grages St., William Berrs, Pa

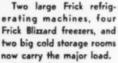




Another COMMUNITY REFRIGERATION CENTER Selects Frick Equipment

The Sodus (Michigan) Fruit Exchange processes 60 tons of fruit a day; quick-freezes up to 100 tons; stores 90,000 bushels; operates a locker plant; and sells all kinds of

farm machinery, hardware, feeds, and fertilizer.



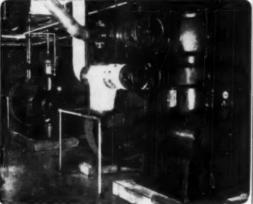
Frick refrigerating, icemaking and air conditioning equipment can perform similarly varied services for YOU. Let us demonstrate how today's cooling systems can increase your profits.⁴



FRICK BLIZZARD FREEZERS

Also Builders of Power Farming and Sawmill Machinery

Frick Second-stage and Booster Compressors at Sodus



Index of ADVERTISERS

The Advertiser's Index is published as a convenience, and not as a part of the advertising contract. Brery care will be taken to index correctly. No allowance will be made for errors or failure to insert

L	Republic Rubber Division (Lee Rubber & Tire Corp.) 32 Richardson Scale Co.
Liberty Engineering & Mfg.	Riley Stoker Corp 14 and 15
Co	Robbins & Myers Inc. 88
Link-Belt Co	
Lunkenheimer Co *	
	S
	Sarco Co., Inc
М	Shepard Niles Crane & Hoist Corp
	Sinclair Refining Co
Manning. Maxwell &	Smith Corp., Winfield H *
Moore, Inc. *	Smooth on Mfg. Co 113
Mason Neilan Regulator Co *	Southern Natural Gas Co *
Mercoid Corp. *	Southern Railway System 34A
Metalock Casting Repair Service	Springfield Boiler Co 9
Minneapolis Honeywell Regula-	Standard Oil Co., Inc
tor CoIndustrial Div 85	Sterling Electric Motors Inc., 103
Minneapolis Moline * Murray Mfg, Co. D. J *	Subox, Inc
Sturray site. Co. D. J	Superior Combustion Industries,
	Inc *
	Swartwout Co., The *
N	
National Airoit Burner Co.,	T
National Aluminuate Corp 1	*
National Boiler Protector Co. 109	Taylor Forge & Pipe Works, 33
National Valve & Mfg. Co 28	Terry Steam Turbine Co The 40
Niagara Blower Co 90	Texas Co 2
Nicholson & Co. W. H 113	Thermix Corp *
Northern Equipment Company 97	Todd Shipyards-Corp *
Norton Co	Tri-Lok Co
	trice ruse Mig. Co
0	U
0	
Oakite Products. Inc	U. S. Hoffman Mchy. Corp * U. S. Treasury
Okonite Co	AL DE STREET

P	
Pacific Pumps. Inc	Wagner Electric Ce. Waldrop Corp. John Walworth Co. 101 Want Ads 110 Warren Steam Pump Co. Inc. 91 Western Precipitation Corp. 93 Westinghouse Electric Corp. Wheeler Mfg. Co. C. H. 111 Wickes Boiler Co. Wiegand Co. Edwin L. Wiggins Co. John B. 106 Worthington Pump & Mehy
	Corp. *

Pritchard Co. J. P 100	Wiegins Co. John B
R	
Raybestos Manhattan, Inc., Packing Division 8	Y
Republic Flow Meters Co 35	Yarnall-Waring Co., 10, 11 and 71



with an exclusive new design

that assures smooth action,

positive closure, and longer life

In the new Jenkins SWINGTITE Fast-Action Bronze Gate Valve, the exclusive rolling disc and guide track design lengthens valve life and assures maximum tightness as it prevents uneven wear of seating surfaces. As the valve is opened or closed, guide rims around the seating surfaces of discs roll freely over guide tracks cast in the body, distributing wear evenly, dislodging foreign matter, and providing a polishing action for seating surfaces.

The SWINGTITE can be opened or closed instantaneously and easily with less than a quarter turn of the malleable iron lever which activates the self-adjusting ball and socket type double disc.

Wherever full, free flow is essential . . . where valve opening or closing must be instantaneous . . . you will see more and more Jenkins SWINGTITE Bronze Gate Valves setting new standards of performance and endurance. They are recommended especially for such services as laundry machinery, dish-washing equipment, gasoline and fuel oil lines, fire extinguishing steam lines in kitchens, and dispensing lines to tanks or vats.

Get all the facts on the new Jenkins SWING-TITE. Find out how much smoother-operating, how much langer-lasting these fast-action Bronze Gate Valves can be when Jenkins builds them. Send for the new folder, Form No. 196, containing full details. Jenkins Bros., 100 Park Avenue, New York 17, N.Y. Jenkins Bros., Ltd., Montreal.

Sold through leading Industrial Distributors



Joshine Brog



DOWELL SERVICE CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS

Mill "M" asked:

"How fast can you clean
a boiler?"

Dowell Service cleaned the internal surfaces in 10 hours!

This was the case of a boiler generating 350,000 pounds of steam per hour with an operating pressure of 1250 p.s.i. In ten hours Dowell Service removed an estimated 1,000 lbs. of deposits which were causing tube failures. The boiler was back on the line the next day.

What is Dowell Service? It is simply the application of chemistry to the problem of removing deposits from heat exchangers, water lines and all kinds of process equipment, Dowell engineers fill the equipment with liquid solvents which reach wherever steam and water flow and are designed to dissolve and disintegrate the deposits efficiently and quickly. Dismantling is not necessary.

Somewhere in your plant there is a job that can be done faster, better, more economically by Dowell Service. Let an experienced Dowell Service Engineer help you with your maintenance planning. No obligation, of course.

Other recent Dowell jobs:

Entire Piping Systems of two college dormitories cleaned of scale.

Three Formaldehyde Contact Towers and Reboilers cleaned and restored to designed operating efficiency.

Six Black Liquor Evaporators cleaned for paper company. Deposits removed from vapor and liquor sides in one operation.

DOWELL INCORPORATED - TULSA 3, OKLAHOMA

SUBSIDIARY OF THE DOW CHEMICAL COMPANY

New York 20 Baston 16 Philodelphia 2 Baltimore 18 Wilmington 99 Richmond 19 Jacksonvilla

Reflata 2 Cleveland 13 Pittsburgh 19 Detroit 2 Chicage 2 St. Louis 8 Indianopolis Louisville Kenses City 8 Wichite 2 Oklohome City 2 Houston 2 New Orleans 12 Ft. Worth 2 Shreveport 69 Mt. Ploasent, Mich. Hemitten, Ohia Cherleston 27, W. Va, Selem, Illinois Berger, Texas Midland, Texas Wichite Fells, Texas Lafayette, La.



